European Commission

JRC SCIENTIFIC AND POLICY REPORTS

Social Sustainability in Trade and Development Policy

A Life Cycle Approach to Understanding and Managing Social Risk Attributable to Production and Consumption in the EU-27

Nathan Pelletier
Eda Ustaoglu
Catherine Benoit
Greg Norris

2013

Report EUR 26483 EN 2013

Joint Research Centre

European Commission
Joint Research Centre
Institute for Environment and Sustainability

Contact information
Nathan Pelletier
Address: Joint Research Centre, Via Enrico Fermi 2749, 21027 Ispra (VA), Italy
E-mail: nathan.pelletier@jrc.ec.europa.eu
Tel.: +39 0332 78 5074
Fax: +39 0332 78 6645

http://ies.jrc.ec.europa.eu/
http://www.jrc.ec.europa.eu/

This publication is a Reference Report by the Joint Research Centre of the European Commission.

JRC87786

EUR 26483 EN

ISBN 978-92-79-35408-3 (pdf)

ISSN 1831-9424 (online)

doi: 10.2788/659

Luxembourg: Publications Office of the European Union, 2013

Printed in Italy

Social Sustainability in Trade and Development Policy

A Life Cycle Approach to Understanding and Managing Social Risk Attributable to Production and Consumption in the EU-27

Nathan Pelletier[1], Eda Ustaoglu[1], Catherine Benoit-Norris[2], Greg Norris[2]

(1) European Commission Joint Research Centre, Institute for Environment and Sustainability
(2) New Earth

Contents

List of Tables

List of Figures

ABSTRACT

Improving social sustainability within Europe and abroad is among the founding premises of the European Union. European Commission external policy documents – in particular, those associated with trade and development - explicitly call for the use of policy instruments as a means of improving social conditions in third countries. Unclear, however, is the extent to which progress in social sustainability as a result of Commission policy measures is being assessed, or measures to further leverage improved social sustainability implemented.

Life cycle thinking (LCT) refers to a management philosophy predicated on holistic consideration of management alternatives for the purpose of preventing unintentional burden shifting – whether between supply chain activities or issue areas. Significant strides have already been made in the environmental domain to operationalize life cycle thinking in European Commission policies, with supporting methodological norms, frameworks, tools and data. To date, comparable approaches and instruments are lacking in support of life cycle-based social sustainability policy initiatives. Such information and tools are critical in support of improved policy design, implementation, monitoring and/or reformulation.

Social risk refers to the potential for one or more parties to be exposed to negative social conditions that, in turn, undermine social sustainability. We conducted a macro-scale analysis of the social risk profile of EU-27 trade by combining trade statistics regarding imports from intra- and extra-territorial trading partners in 2010 with country and sector-specific social risk indicator data. These data cover 17 social themes in five thematic areas: Labour Rights and Decent Work; Health and Safety; Human Rights; Governance; and Community Infrastructure. We assessed the apparent social risk profiles of EU-27 imports based on consideration of country-of-origin social risk data only, compared to a life cycle-based social risk assessment which took into account the distribution of social risk along product supply chains. Our intention was to better understand how and to what extent current trade-based consumption in the EU-27 may be associated with socially unsustainable conditions, and the value of applying a life cycle perspective for sustainability management in this context.

Our analysis underscores the importance of a life cycle-based approach to understanding and managing social risk in support of policies for socially sustainable development. Moreover, the methods and information presented herein offer a potentially powerful decision-support tool for policy makers wishing to better understand the magnitude and distribution of social risk associated with EU production and consumption patterns, the mitigation of which will contribute to socially sustainable development within Europe and abroad. A novel opportunity hence presents itself for decision makers and those who provide scientific and technical support to policy making to collaborate closely in moving forward the agenda for socially sustainable development. This will require the identification of strategic policy directions and supporting research projects, building upon existing, complementary environmental and economic sustainability assessment tools within the European Commission, which will continue to strengthen the elaboration, implementation, and impact assessment of science-based policy for sustainable development.

1. INTRODUCTION

Externalities in economic transactions are costs or benefits of a transaction that are not experienced by the buyer or seller but rather borne by a third party. In a competitive market, negative or positive externalities may lead to over or under provision of the products (i.e. goods or services) that cause them (Daly and Farley 2004), and hence to socially sub-optimal outcomes. Potential negative externalities include a spectrum of environmental and social impacts.

For both producers and consumers in the global marketplace, externalities associated with production and consumption decisions frequently manifest in locations and are experienced by actors that are both spatially and temporally distant (Kissinger *et al.* 2011). They are directly observed neither by the company that produces or markets a product, nor by the final consumer. For example, climate change impacts such as sea level rise are experienced by citizens of low lying, island states rather than by those responsible for the greenhouse gas emissions which lead to increased atmospheric radiative forcing. Similarly, a purchaser of a laptop computer in Europe will likely be unaware that the low price of the product may reflect, in part, occurrences of forced labour, child labour, the lack of protection of other fundamental labour rights, or other social issues upstream along the product's supply chain.

Moral hazard occurs where parties are likely to take risks because the costs of those risks are felt by others rather than by themselves. In light of the opaqueness of most product supply chains, every purchase decision creates a risk of perpetuating externalities. The global marketplace is thus characterized by a chronic condition of potential moral hazard for both producers and consumers. This is equally true at the level of trading units, including both countries and trading blocks, as well as the policy measures that support them.

Sustainability is a guiding principle and objective for policy development in the European Commission (EC) (European Council 2001). The EU Sustainable Development Strategy (SDS) requires an impact assessment of all major policy proposals vis-à-vis sustainability objectives (COM (2009) 400). Methodological development is on-going to provide frameworks, tools, indicators and data for assessing the sustainability performance of Commission policies relative to defined sustainability thresholds and targets across environmental, social and economic domains (Pelletier *et al.* 2013). Notable progress has already been made with respect to developing life-cycle based environmental indicators in support of monitoring and managing the externalization of environmental risk associated with production and consumption in the EU, including extra-territorial imports (EC 2012). Comparable life cycle-based measurement tools and indicators for tracking the social sustainability dimensions of production and consumption in order to guide EC policy making, however, are largely lacking. Given that targets and aspirations with respect to a variety of social sustainability issues, and how these can/should be advanced via trade and development policy, are readily identifiable in EC policy documents (see section 1.1) this would seem to represent a significant gap in current scientific support to policy making.

1.1 Social Sustainability in the Context of EU Trade and Development Policy

The recognition that social cohesion is an integral element of sustainable development underpins many of the strategic economic and social policy goals of the European Commission. This is exemplified in the Commission's *Communication on 'A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development'* (EC 2001a); and the *EU's Sustainable Development Strategy*, which was included in the Communication concerning the Union's contribution to global sustainable development. These themes are similarly explicitly reflected in the EC's social policy agenda, which was adopted at the Nice European Council in December 2000 (EC 2000a). *The Charter of Fundamental Rights of the EU*[1] proclaimed in Nice confirms the European Commission's aim to promote and fully integrate fundamental rights in all of its policies and actions.

Promoting socially sustainable development is also integral to the external policies of the European Commission, in particular with respect to trade and development. Indeed, the founding Treaty of the European Union specifically includes the objective of 'fostering sustainable economic, social and environmental development of developing countries, with the primary goal of eradicating poverty' (Article 21(3)). A statement by the Council and the Commission on the Community's development policy in November 2000 reconfirmed that the EC's means of action available under poverty reduction strategies should be co-ordinated so as to cover, inter alia, the social aspects of development (EC 2000b). Following the Lisbon Treaty (Article 21(3) TEU and Articles 205 and 208(1) TFEU), the EU's external policies must respect the 'principles of democracy, the rule of law, the universality and indivisibility of human rights and fundamental freedoms, respect for human dignity, the principles of equality and solidarity, and respect for the principles of the United Nations Charter and international law' (EC 2008a).

With respect to development policy, the Commission enacted Regulation No 1889/2006 on establishing a financing instrument for the promotion of democracy and human rights worldwide, stating that:

> *"…whilst democracy and human rights objectives must be increasingly mainstreamed in all external assistance financing instruments, Community assistance under this Regulation will have a specific complementary and additional role by virtue of its global nature and its independence of action from the consent of third country governments and other public authorities. This makes possible cooperation with civil society on sensitive human rights and democracy issues, including migrants' enjoyment of human rights, rights of asylum seekers and internally displaced persons, providing the flexibility to respond to changing circumstances or to support innovation…"*

Concerning the EU's commitments with respect to fundamental rights and democratic principles, the Commission gives particular importance to the issue of exploitation of children for economic reasons. A number of measures to facilitate elimination of child labour are promoted, including: 'developing effective and time-bound programmes to eliminate the worst forms of child labour through prevention, protection and rehabilitation; ensuring access to free, quality basic education and, wherever possible and appropriate, vocational training for all children; giving greater visibility to child labour through strengthened data collection,

[1] Chapter IV on solidarity: Article 27 on workers' rights to information and consultation within the undertaking; Article 28 on right of collective bargaining and action; Article 30 on the protection in the event of unjustified dismissal; Article 31 on fair and just working conditions; Article 32 on the prohibition of child labour and the protection of young people at work. Chapter I on dignity: Article 5 prohibits slavery and forced labour.

analysis and dissemination; and promoting awareness of children's rights to protection from economic exploitation, and the need for priority action against the worst forms of child labour' (EC 2001b Section 5.2.2. 'Bilateral relations: Agreements, assistance and capacity strengthening').

With respect to trade policy, since the early 1990's all EU trade agreements have been required to incorporate a clause defining 'human rights' as a basis element. This clause encompasses the core labour standards as defined in the International Labour Organisation (ILO) Conventions[2]. More specifically, the Council conclusions of October 1999[3] outline the EU's position on trade and labour in social development. Here, the Council agreed that the EU should strongly support the protection and respect for core labour standards; provide support for the work of the ILO as well as its co-operation with the World Trade Organisation (WTO); and oppose any sanctions-based approaches (EC 2001b).

In general terms, the co-operation agreements concluded between the EC and third countries encompass both economic and social co-operation. On this basis, the Community has introduced the Generalised System of Preferences (GSP) scheme to provide market access on a preferential basis to developing countries along with incentives intended to leverage socially sustainable development. The current GSP Regulation (Council Regulation (EC) No 1256/96 of 20 June 1996 and Council Regulation (EC) No 3281/94 of 19 December 1994) address the issue of core labour standards by: 'a) providing a positive incentive scheme whereby effective compliance with core labour standards qualifies for additional trade preferences; and b) allowing for a withdrawal, in whole or in part, where beneficiary countries practice any form of slavery or forced labour'[4]. In line with the latest GSP scheme, the Commission proposed that, as part of the political dialogue with third countries, discussions should cover 'how ratification of the fundamental human rights instruments and of other rights-based international agreements (in particular ILO conventions) and their effective implementation could be pursued' (EC 2001c).

As a specific example, the Cotonou Agreement between the EC and the 77 African, Caribbean and Pacific Group (ACP) states established in 2000, includes a specific provision on trade and labour standards that confirms the parties' commitment to core labour standards[5]. The Commission subsequently committed to extending the Cotonou approach to other agreements by seeking to similarly include specific provisions on core labour standards (EC 2001b).

Besides the improvement of social governance and the promotion of core labour standards, a further relevant development in the EU is the growing importance of private initiatives in support of fostering social sustainability such as codes of conduct and social labels. In order to promote coherence and transparency with regard to such initiatives, the Commission prepared a green paper on "Promoting a European Framework for

[2] Core labour standards are based on the ILO conventions including: a) Convention 138 concerning Minimum Age for Admission to Employment; b) Convention 182 concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour; c) Convention 105 for the Abolition of Forced Labour; d) Convention 29 concerning Forced or Compulsory Labour; e) Convention 100 concerning Equal Remuneration for Men and Women Workers for Work of Equal Value; f) Convention 111 concerning Discrimination in Respect of Employment and Occupation; g) Convention 87 concerning Freedom of Association and Protection of the Right to Organise; and h) Convention 98 concerning the Application of the Principles of the Right to Organise and to Bargain Collectively.

[3] In: Commission Communication on Promoting Core Labour Standards and Improving Social Governance in the Context of Globalisation, Annex I; Council Conclusions of October 1999 on Trade and Labour, 18 July 2001, COM (2001)416 Final

[4] According to the most recent GSP scheme covering 2006-2008 period, to become beneficiaries, countries are subject to a general obligation to ratify and effectively implement the international conventions including a) Core human and labour rights UN/ILO Conventions; b) Conventions related to the environment and governance principles. See: http://europa.eu/legislation_summaries/external_trade/r11020_en.htm

[5] Title II: Economic and trade co-operation, Chp.5: Trade-related areas, Article 50: Trade and labour standards

Corporate Social Responsibility" (EC 2001d). This paper underscores the need for all such codes and labels to uphold, as a minimum, the core ILO standards. Also clearly established here is that corporate social responsibility must extend beyond the borders of Europe to encompass global supply chains. The Commission noted that 'despite the existence of international instruments such as the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy and the OECD Guidelines for Multinational Enterprises, *human rights* remain a very complex issue presenting political, legal and moral dilemmas' (EC 2001d).

The Commission's subsequent *Communication on 'Corporate Social Responsibility: A Business Contribution to Sustainable Development'* encourages the adoption of 'codes of conduct, management standards, instruments for measuring performance, labels on products, and standards for Socially Responsible Investment (SRI), in order to direct investors towards enterprises in light of their corporate social responsibility results' (EC 2002). In a later Commission report (EC 2006a), corporate social responsibility is highlighted as means of stimulating 'the inclusion of disadvantaged groups in the market, an increase in investment in skills development, improvement in public health by means of labeling foodstuffs and non-toxic chemicals, innovation on social and environmental matters, reduced levels of pollution and a more rational use of natural resources, and the respect for European values and standards on human rights, environmental protection and employment' (see EC 2006a).

More recently, the Commission released the *Communication on 'Contributing to Sustainable Development: The Role of Fair Trade and Non-Governmental Trade-Related Sustainability Assurance Schemes'* (EC 2009a). The Communication defines Fair Trade as requiring 'compliance with the ILO core conventions, specifically with regard to decent work, trade union freedom and labour standards; respect for human rights, the environment and traditional methods; transparency and traceability throughout the supply chain; the definition of a fair price which covers the costs of sustainable production and living and the possibility for part payments to be made to producers in advance; establishing a certification process; impact assessment of Fair Trade activities; and raising the awareness of stakeholders and consumers on the aims and operation of Fair Trade' (see EC 2009a). Here, it is highlighted that the introduction of international fair trade labels in Member States has strengthened consumer confidence and recognition of Fair Trade products.

In light of the Commission's clear and repeated commitments to fostering socially sustainable development through trade and development policy as well as by supporting private sector initiatives, means to understand, benchmark, and track progress with respect to the social sustainability performance of both Member States and third countries are imperative. So, too, social sustainability assessments of EU trade in order to provide benchmarks and to identify priority foci for targeted policy interventions.

1.2 Social Life Cycle Assessment

Life cycle thinking (LCT) refers to a management philosophy predicated on holistic consideration of management alternatives for the purpose of preventing unintentional burden shifting – whether between supply chain activities or issue areas (Pelletier *et al.* 2013a). In the context of sustainable production and

consumption, LCT typically focuses on product supply chains. Environmental life cycle assessment (LCA) is a well-established framework for operationalizing life cycle thinking in the evaluation of product supply chains. An LCA of a given product involves compiling an inventory of material and energy flows and emissions characteristic of each supply chain stage, from resource extraction through end-of-life activities. A selection of environmental impact assessment methods is subsequently applied to the inventory in order to quantify the extent to which the provision of a pre-determined quantity of the product contributes to a subset of environmental, human health, and resource depletion-related impact potentials (EC 2010). Methods for environmental LCA have been the subject of considerable research effort and harmonization initiatives world-wide (Pelletier *et al.* 2013b). As a result, there is already a substantial degree of consensus (currently embodied in the ISO-14044 norm (ISO 2006)) regarding best practices.

Environmental life cycle assessment is widely applied as part of the environmental management toolbox – both at the product and organization level. This approach has also been used for macro-scale analyses in order to better understand the environmental implications of activities in whole sectors, countries, or production and consumption patterns. For example, the European Commission has developed prototype indicator frameworks that enable tracking environmental impacts related to EU-27 production and consumption, including internationally traded commodities, using environmental LCA (EC 2012). These indicators provide insight as to what fraction of specific environmental impacts associated with apparent domestic consumption occur outside of the EU-27 itself – in effect, a measure of the externalization of environmental risk. In general, European policy related to consumption and production (which accounts for the majority of environmentally relevant economic activities) is strongly linked to Life Cycle Thinking (LCT). The Commission has launched a number of activities to strengthen environmental LCT in both policy and business contexts (COM (2003)302; COM (2005)666; COM(2005)670; COM(2008)98; COM(2008)397; COM(2010); COM(2011)21).

Although long recognized as similarly important to the sustainability management toolbox (Klopffer 2002), commensurate, life cycle-based methods for considering the social and economic dimensions of production and consumption activities are considerably less developed, as is their incorporation into European Commission policies. Life cycle costing (LCC) has emerged as one approach to incorporating a subset of economic considerations into life cycle-oriented assessments. LCC quantifies costs (related to real money flows) associated with the life cycle of a product that are covered by one or more actors in the supply chain (White *et al.* 1996; Norris 2001a,b; Shapiro 2001; Hunkeler and Rebitzer 2001). LCC is parallel in many respects to conventional cost accounting (including cost categories such as subsidies as well as costs related to the use and end-of-life treatment of products, but from a life cycle perspective). However, it can also include public, external costs – for example, externalized environmental costs.

Social life cycle assessment (s-LCA) is the least developed of these three, complementary strands of life cycle assessment, with the majority of substantive progress made within the last few years only. In complement to environmental LCA, social LCA is intended for the purpose of improved decision support in understanding and identifying measures to reduce the social impacts associated with product life cycles (Jorgensen 2013). Aspects that effect stakeholders either positively or negatively are considered. The purpose is not to determine whether or not a product should be produced, but rather to shed light on the social dimensions of product supply chains (UNEP/SETAC 2009).

Methodological discussions regarding social LCA were initiated in the early 1990's (O'Brien *et al.* 1996) but little substantive advances were made until well into the first decade of the 21st century. Since 2004, however, a small but increasing number of peer-reviewed contributions have been published which discuss various concepts and methods for social LCA, along with several case studies (Schmidt *et al.* 2004; Dreyer *et al.* 2006; Norris 2006; Weidema 2006; Jorgensen *et al.* 2008, 2010; Benoit *et al.* 2010a; Parent *et al.* 2010; Ramirez and Petti 2011; Reitinger *et al.* 2011; Feschet *et al.* 2013; Lagarde and Macombe 2013; Ekener-Petersen and Finnveden 2013; Jorgensen 2013).

The 2009 publication of the UNEP/SETAC "Guidelines for Social Life Cycle Assessment of Products" represented an important first step towards developing consensus methodologies for s-LCA. According to UNEP/SETAC (2009), the guidelines provide "a map, a skeleton, and a flashlight." Here, the "map" refers to the broad nature of the guidelines, which describe key concepts of social LCA and their historical context. "Skeleton" refers to the fact that the guidelines provide a foundation only, on which it is envisaged that stakeholders will engage in pushing forward methodological development. "Flashlight" underscores the role of the guidelines in highlighting research needs. In short, considerable work remains – in particular with respect to developing widely accepted social indicators and impact assessment methods.

Life cycle-based analyses require considering activities and interactions that occur along the supply chain of interest. They are, hence, data-intensive by nature, since representative data are required for each supply chain stage and associate process. Environmental life cycle assessment studies typically make use of third-party life cycle inventory databases. Such databases contain process-level data that describe the material and energy inputs and outputs associated with "back ground" supply chain activities – for example, the extraction and processing of raw materials, energy carriers, or transport modes – that may be inputs to a product life cycle of concern. The availability of such life cycle inventory data greatly reduces the data collection burdens of a product-level environmental LCA. A variety of public and private sector environmental life cycle inventory databases are now available for use by LCA practitioners. Examples include the widely-used, proprietary Eco-Invent database (http://www.ecoinvent.ch/), and the publically available European Life Cycle Inventory Database (ELCD) (http://elcd.jrc.ec.europa.eu/ELCD3/).

One of the key challenges to carrying out s-LCA studies to date has been the lack of comparable inventory data to support characterizing social risks and benefits along product supply chains. The recently developed Social Hotspots Database (SHDB) (http://socialhotspot.org/) has therefore filled a critical gap for LCA practitioner's wishing to conduct screening-level social life cycle assessments of product supply chains. The SHDB is a repository of social indicator data relevant to five overarching thematic areas: Labour Rights and Decent Work; Health and Safety; Human Rights; Governance; and Community Infrastructure. While originally intended for microscale, product-level assessments, this data availability also creates the possibility of considering the macroscale social dimensions of production and consumption, including international commodity trade flows.

Here, we describe a methodology for evaluating the social risks of production and consumption in the EU, with a specific, preliminary focus on intra- and extra-territorially traded commodities. Specifically, we evaluate a subset of social risks at the sector level that are potentially associated with products imported into EU-27 Member States, either from intra- or extra-territorial trading partners in 2010.

We evaluate the relevance of taking a life cycle approach in this context via two parallel analyses. The first takes into consideration only country/sector of origin-specific social risks (i.e. not including supply chain social risks), using raw data from the Social Hotspots Database. Our second analysis uses the Social Hotspots Database in combination with the SimaPro life cycle assessment software package from Pre Consultants (http://www.pre-sustainability.com/), this time taking into account the entire cradle-to-producer gate social risk profile of domestically produced versus imported products. We also compute "externalization ratios" based on the results of each analysis, which represent the ratio of social risks associated with intra- versus extra-territorial imports in the same sectors. On the basis of a comparison of apparent social risk profiles using these two analytical approaches, we discuss the relevance of applying a life cycle approach in formulating and evaluating trade and development policy for the purpose of furthering EU objectives with respect to social sustainability.

Next, we provide an example of how these methods can be adapted for use in existing EC policy support sustainability indicators via a partial application to the Basket of Products indicator – a framework for benchmarking and monitoring the environmental impacts of the average European consumer based on apparent annual per capita consumption in key demand categories. We conclude with a summary of future research needs in support of life cycle based approaches to managing the social sustainability dimensions of European production and consumption, and how these might best be integrated with parallel environmental and economic sustainability indicators.

2. METHODS

2.1 Social Hotspots Database Methods

The Social Hotspots Database is a repository of social indicator data relevant to five overarching thematic areas: Labour Rights and Decent Work; Health and Safety; Human Rights; Governance; and Community Infrastructure. In the version of the SHDB employed in the current analysis, each of these five areas is further sub-divided into 17 social themes (Table 1) based on 22 social risk indicators (which are, in turn, calculated based on 137 sub-indicators) (see Appendix A). These indicators were developed based on the recommendations of the UNEP/SETAC Guidelines for Social Life Cycle Assessment (UNEP/SETAC 2009), the ISO 26000 Guidelines for Social Responsibility (ISO 2010), the Global Reporting Initiative (GRI) G3 Guidelines, (GRI 2006) and the Global Social Compliance Programme (GSCP) Reference tools (GSCP 2012).

Table 1. Thematic areas and social themes included in the SimaPro LCA software version of the Social Hotspots Database (for sub-indicators and weighting factors used to calculate results for each social theme and thematic area, see Appendix A).

Labour Rights and Decent Work	Health and Safety	Human Rights	Governance	Community Infrastructure
Child labour	Injuries and fatalities	Indigenous rights	Legal systems	Hospital beds
Forced labour	Toxics and hazards	Gender equity	Corruption	Drinking water
Excessive working time		High conflicts		Sanitation
Wage assessment				
Poverty				
Migrant labour				
Freedom of Association, Right to Strike, and Collective Bargaining Rights				

Data used to populate the SHDB are drawn from a broad range of reputable, publically available sources such as the statistical agencies of the World Bank, the World Health Organization, and the International Labour Organization. Privately held audit databases are also used. In total more than 200 data sources are consulted. For an exhaustive list of data sources used for each indicator, see www.socialhotspots.org. Where data sources do not contain comprehensive data across countries for specific issues, multiple data sources are used and the findings triangulated.

The data currently available for each indicator cover 113 specific countries and 57 sectors (for a total of 6,441 country/sector-specific combinations) as defined in the Global Trade Analysis Project (GTAP) input-output economic general equilibrium mode (GTAP 2013). For other countries where data is currently unavailable, regionally representative countries are used as proxies, extending total coverage in the SHDB to 227 countries. These data are used to characterize the risk of specific social issues occurring for each of the 137 sub-indicators (if relevant) for each country-specific sector. Risk levels are characterized as low, medium, high, or very high.

Characterization levels are based on data distribution for all countries (i.e. relative risk), expert consensus, and literature references. Where sector-specific data are not available for a given country or indicator, then country-level data are used. Complete data sets for the current analysis were available for 115 of the 137 sub-indicators.

The SHDB is intended for assessing social risk and identifying hotspots in product supply chains. This is accomplished by using the Life Cycle Attribute Assessment approach (Norris 2006) to aggregate social risks (attributes) that occur at different points along product supply chains based on a common activity variable. In this case, the activity variable employed is worker hours. The SHDB uses a Worker Hours Model that is derived by dividing total wages paid out by country and sector per dollar of output based on the GTAP I-O model, and country/sector-specific wage estimates to characterize worker hours per country, sector, and dollar of output. By multiplying the level of social risk in country-specific sectors by the worker hours per dollar of output in each sector, the SHDB hence allows for quantifying (in an additive manner) and assessing the distribution of potential social risks along product supply chains. This provides, in essence, a screening-level life cycle-based social risk assessment that can be used to identify processes in the supply chain with high labour inputs or high potential social risks. Risks are quantified in units of "medium risk hours," which is the number of worker hours along the supply chain that are characterized by specific or aggregate social risk. Here, risks levels are weighted for each indicator in order to express instances of low risk, medium risk, high risk and very high risk in terms of "medium risk hour-equivalent units" (mrh eq) (see Appendix A). For a description of specific characterization models, see Benoit *et al.* (2010b). This is a similar approach to environmental LCA, where "reference species" (such as the use of CO_2-equivalent units to express the relative contributions to atmospheric radiative forcing of specific greenhouse gases in greenhouse gas emission accounting) are commonly used.

The results for each of the 137 sub-indicators are combined in order to report risk at the level of each social theme (characterization), or for the thematic area as a whole (ie. Labour Rights and Decent Work; Health and Safety; Human Rights; Governance; and Community Infrastructure) (damage assessment). Finally, the social theme results can be aggregated into a single score "social hotspots index." This social life cycle impact assessment method (V0.01) was developed by New Earth (2013). The weighting scheme employed for calculating social risks at the level of characterization, damage assessment, or single scores is described in Appendix A.

The SHDB is currently available for use via a web portal (http://socialhotspot.org/), as well as in several life cycle assessment software packages. For the purpose of the current analysis, both raw data (country/sector specific social risk scores) from the SHDB as well as the SHDB version available in the SimaPro life cycle assessment software package were used

2.2 Mapping EU-27 Trade Flows to SHDB Indicator Data

The Harmonized Commodity Description and Coding System (HS) is a commodity classification system developed by the World Customs Organization (www.wcoomd.org). It provides an international product

nomenclature based on six digit codes. Over 98% of internationally traded merchandise is classified using this system.

We evaluated the social risks attributable to imports of traded commodities into EU-27 Member States in 2010 from both intra- and extra-territorial trading partners by combining Eurostat ComEx (http://epp.eurostat.ec.europa.eu/newxtweb/) import data at the HS06 level with the country/sector-specific social risk indicator data currently available in the Social Hotspots Database. The SHDB reports social risk data at the sector level based on 54 sectors and 113 specific countries (including the 27 Member States of the EU-27) as defined in the Global Trade Analysis Project. Data for additional countries are available in the SHDB based on the use of representative countries as proxies, but these were not included in the current analysis.

We used a concordance table from the World Bank (2013) to map Eurostat HS06 trade data (7395 unique classifications) from ComEx to the GTAP sectors. Since Eurostat trade data does not include services, this reduced the number of GTAP sectors considered in the analysis from 54 to 43 (Table 2). For a detailed description of each GTAP sector, see Appendix B. Where full, six-digit HS06 data were not available for specific trade flows for confidentiality or other reasons, these were excluded from the analysis. This accounted for 1,116 of the 7395 unique HS06 codes reported by Eurostat for imports to EU-27 Member States in 2010. Such exclusions generally represented minor fractions of overall trade flows. In some cases, however, exclusions were non-trivial for certain trading partners. For example, a large fraction (31%) of imports to the EU-27 from Zambia were confidential, hence full, six-digit HS06 codes were unavailable. Overall, however, only 2.5% of import flows by value were excluded from the analysis on this basis (Table 3). For a list of the United Nations (UN) two-digit country codes referred to in Table 3 and throughout this report, see Appendix C.

Data for a total of 78 extra-territorial trading partners, along with the 27 Member States of the EU-27, were considered (Table 3). Although EU-27 Member States actually traded with a total of 202 extra-territorial trading partners in 2010, this nonetheless effectively encompassed 88.4% of imports by value from extra-territorial trading partners, 95.5% of imports by value from intra-territorial trading partners, and 92.8% of overall imports by value into EU-27 Member States in 2010 (Table 3).

Table 2.GTAP sector numbers, codes, and descriptions (sectors in italics were not included in the analysis; nec means "elsewhere classified").

Number	Code	Description	Number	Code	Description
1	PDR	Paddy rice	**30**	LUM	Wood products
2	WHT	Wheat	**31**	PPP	Paper products, publishing
3	GRO	Cereal grains nec	**32**	P_C	Petroleum, coal products
4	V_F	Vegetables, fruit, nuts	**33**	CRP	Chemical, rubber, plastic products
5	OSD	Oil seeds	**34**	NMM	Mineral products nec
6	C_B	Sugar cane, sugar beet	**35**	I_S	Ferrous metals
7	PFB	Plant-based fibers	**36**	NFM	Metals nec
8	OCR	Crops nec	**37**	FMP	Metal products
9	CTL	Bovine cattle, sheep and goats, horses	**38**	MVH	Motor vehicles and parts
10	OAP	Animal products nec	**39**	OTN	Transport equipment nec

11	*RMK*	*Raw milk*	**40**	ELE	Electronic equipment
12	WOL	Wool, silk-worm cocoons	**41**	OME	Machinery and equipment nec
13	FRS	Forestry	**42**	OMF	Manufactures nec
14	FSH	Fishing	**43**	ELY	Electricity
15	COA	Coal	**44**	GDT	Gas manufacture, distribution
16	OIL	Oil	***45***	*WTR*	*Water*
17	GAS	Gas	***46***	*CNS*	*Construction*
18	OMN	Minerals nec	***47***	*TRD*	*Trade*
19	CMT	Bovine meat products	***48***	*OTP*	*Transport nec*
20	OMT	Meat products nec	***49***	*WTP*	*Water transport*
21	VOL	Vegetable oils and fats	***50***	*ATP*	*Air transport*
22	MIL	Dairy products	***51***	*CMN*	*Communication*
23	PCR	Processed rice	***52***	*OFI*	*Financial services nec*
24	SGR	Sugar	***53***	*ISR*	*Insurance*
25	OFD	Food products nec	***54***	*OBS*	*Business services nec*
26	B_T	Beverages and tobacco products	***55***	*ROS*	*Recreational and other services*
27	TEX	Textiles	***56***	*OSG*	*Public Administration, Defense, Education, Health*
28	WAP	Wearing apparel	***57***	*DWE*	*Dwellings*
29	LEA	Leather products			

Table 3. Percent of import flows (by value) for products imported into EU-27 countries from intra- and extra-territorial trading partners in 2010 for which six-digit HS codes were not available (these data were excluded from the analysis), and % by value of overall imports to the EU-27 in 2010 that were included in the analysis (see Appendix C re. 2-digit country codes).

Country of origin	Value of imported goods (euros)	Value of imported goods for which HS06 codes were not available	% of value for which HSO6 codes were unavailable
AL	891,248,927	2,259,147	0.25%
AM	258,764,479	321,386	0.12%
AO	3,851,847,081	2,590,644	0.07%
AR	9,297,791,349	16,882,684	0.18%
AT	79,535,737,481	4,678,921,831	5.88%
AU	12,254,728,352	151,757,216	1.24%
AZ	9,712,679,387	2,250,753	0.02%
BD	6,689,994,842	6,513,921	0.10%
BE	208,564,813,071	7,844,249,920	3.76%
BG	9,157,538,991	509,594,785	5.56%
BO	334,582,663	1,126,640	0.34%
BR	33,143,280,950	126,004,488	0.38%

BW	837,884,690	483,651	0.06%
BY	2,619,721,956	8,684,504	0.33%
BZ	105,176,588	96,641	0.09%
CA	23,971,446,116	561,937,127	2.34%
CH	84,535,335,709	1,266,094,452	1.50%
CL	9,423,078,371	156,598,906	1.66%
CN	282,096,934,077	1,186,613,946	0.42%
CO	4,354,684,149	94,805,935	2.18%
CR	5,573,263,075	1,553,976	0.03%
CS	140	0	0.00%
CY	1,839,141,887	65,575,784	3.57%
CZ	80,171,832,356	2,617,928,034	3.27%
DE	555,254,494,290	16,975,749,808	3.06%
DK	44,782,689,848	2,250,697,488	5.03%
DO	726,445,699	14,521,316	2.00%
DZ	20,897,999,805	4,416,459	0.02%
EC	2,008,307,331	1,891,994	0.09%
EE	5,454,421,276	345,305,675	6.33%
EG	7,142,441,450	57,010,690	0.80%
ES	124,675,034,131	2,940,818,470	2.36%
ET	489,967,986	2,126,155	0.43%
FI	29,886,424,702	1,224,039,166	4.10%
FR	237,628,675,331	8,510,544,404	3.58%
GB	165,740,452,359	6,786,485,543	4.09%
GE	564,909,741	2,173,940	0.38%
GH	1,464,339,774	3,234,662	0.22%
GL	318,128,197	12,242,875	3.85%
GQ	2,290,147,450	153,207	0.01%
GR	10,688,242,816	361,493,779	3.38%
GT	401,370,356	790,151	0.20%
HK	14,294,801,766	216,566,216	1.51%
HR	4,957,081,068	28,951,099	0.58%
HU	51,361,743,021	1,252,260,663	2.44%
ID	13,816,964,936	24,106,034	0.17%
IE	60,461,687,537	1,018,054,315	1.68%
IN	33,266,098,995	214,654,709	0.65%
IR	14,520,945,201	24,209,511	0.17%
IS	2,655,393,247	9,641,665	0.36%
IT	181,422,344,254	7,704,887,599	4.25%
JP	66,920,210,348	467,819,212	0.70%
KE	1,111,848,311	2,639,165	0.24%
KG	198,434,096	233,852	0.12%
KH	906,092,017	278,778	0.03%

KR	39,352,816,842	117,855,019	0.30%
KZ	15,602,212,040	109,334,903	0.70%
LA	170,586,077	174,016	0.10%
LK	2,190,470,817	7,728,329	0.35%
LT	8,863,144,977	382,475,623	4.32%
LU	12,416,865,647	338,855,456	2.73%
LV	5,021,016,048	256,238,403	5.10%
MA	7,606,166,944	17,753,716	0.23%
MD	581,674,224	1,073,109	0.18%
MG	480,899,635	167,489	0.03%
MM	161,829,933	858,518	0.53%
MO	77,684,543	9,570,445	12.32%
MT	1,712,421,585	36,386,024	2.12%
MU	883,271,302	623,805	0.07%
MW	234,356,961	150,181	0.06%
MX	13,680,004,694	170,072,672	1.24%
MY	20,567,807,668	84,451,958	0.41%
MZ	1,391,512,070	171,686	0.01%
NA	1,158,520,321	763,078	0.07%
NG	14,464,201,043	17,651,820	0.12%
NI	190,350,654	542,866	0.29%
NL	305,947,485,758	6,644,797,652	2.17%
NO	65,696,341,675	234,358,888	0.36%
NP	84,684,088	616,789	0.73%
NZ	2,747,959,062	27,308,234	0.99%
PA	646,175,939	1,839,246	0.28%
PE	5,181,435,047	33,426,734	0.65%
PG	619,390,563	158,254	0.03%
PH	5,624,082,758	12,715,564	0.23%
PK	3,819,217,346	28,743,259	0.75%
PL	89,172,885,491	3,356,809,882	3.76%
PT	25,903,351,297	1,359,735,137	5.25%
PY	991,406,948	291,008	0.03%
QA	7,904,392,302	30,744,638	0.39%
RO	24,499,931,321	857,168,523	3.50%
RU	147,734,884,191	2,778,897,634	1.88%
SE	68,916,369,743	1,917,291,331	2.78%
SG	18,732,707,536	331,170,545	1.77%
SI	13,211,513,292	465,947,837	3.53%
SK	38,293,672,164	862,140,568	2.25%
SN	296,942,386	930,062	0.31%
SR	288,355,795	46,076	0.02%
TH	17,324,758,705	84,350,833	0.49%

TL	7,895,911	0	0.00%
TN	9,516,293,761	16,789,032	0.18%
TR	42,264,964,764	144,996,404	0.34%
TW	24,099,692,690	131,251,421	0.54%
TZ	360,982,276	1,422,963	0.39%
UA	11,040,234,444	23,691,179	0.21%
UG	389,119,744	1,813,829	0.47%
US	169,037,086,570	4,198,102,355	2.48%
UY	1,323,503,209	2,124,326	0.16%
UZ	346,554,526	1,093,097	0.32%
VE	3,790,371,260	3,062,542	0.08%
VN	9,584,543,533	10,152,317	0.11%
ZA	19,973,961,338	376,170,832	1.88%
ZM	212,703,015	65,890,119	30.98%
ZW	297,850,636	377,052	0.13%
Total	3,808,221,159,135	95,320,170,249	

Actual total value of all EU-27 imports in 2010 (euros)	**4,001,756,652,203**
% of actual total imports from intra-territorial trading partners included in analysis	**95.5**
% of actual total imports from extra-territorial trading partners included in analysis	**88.4**
% of actual total imports from all trading partners included in analysis	**92.8**

2.3 Combining SHDB and EU-27 Trade Data to Assess Social Risk

We combined the GTAP-mapped Eurostat ComEx trade data and SHDB social risk indicator data in order to evaluate the social risks attributable to both intra- and extra-territorial imports of products in the EU-27 in two ways. First, we undertook to assess the comparative social risks attributable to products imported into the EU-27 from extra-territorial trading partners compared to similar products produced and traded within the EU-27, taking into account the social risk scores for country- and sector-of-origin only (i.e. not using a life cycle approach). Here, we used Excel spreadsheets to multiply the social risk scores of imports for each country/sector combination by the % by value that imports from the country/sector combination contributed to total (intra- or extra-territorial) import values for that sector. This resulted in a value-weighted average indicator score per euro of imports for each sector and for each of the 117 sub-indicators, which were subsequently also multiplied by total trade value by sector to obtain overall risk scores for each sub-indicator. We applied the same set of sub-indicators and the same weighting scheme used in the life cycle-based social risk assessment method in order to re-express the sub-indicator results per indicator (characterization), social theme (damage assessment) and as a single score (for the Migrant Labour indicator, the 10 SHDB sub-indicators referring to migrant labour were averaged as a proxy for the LCA software LCIA method “Risk that migrant workers are treated unfairly” indicator). This allowed us to rank sectors in terms of apparent social risk per euro spent on imports from a sector as well as based on the total value of sectoral imports for both intra-

and extra-territorial imports. We also computed "externalization ratios," which are intended to convey the ratio of risk associated with the production of traded products outside of territorial boundaries to that which occurs within the EU-27, per euro spent on traded goods in each sector.

We subsequently conducted a life cycle-based evaluation of the social risk profile of EU-27 imports in 2010 using the version of the SHDB currently available in the SimaPro 8.0 software package. Here, we entered all GTAP-mapped trade data for imports by sector from intra- and extra-territorial trading partners into a SimaPro model and used the Social Life Cycle Impact Assessment Method Version 01.1 to assess the magnitude and distribution of social risks attributable to EU-27 trade by sector and in aggregate. Characterization results by social theme, damage assessment results by thematic area, and aggregated, single scores for life cycle social risks were generated. Finally, we once again computed externalization ratios per euro spent on trade in each sector.

In order to directly compare the country-of-origin versus life cycle-based social risk assessments, we transformed both into % contributions to total risk for each measure. We subsequently compared results between the country-of-origin and life cycle-based assessments in order to determine if these two approaches provide different 'signals', and to evaluate the relevance of a life cycle approach to understanding and managing social risk.

2.4 Application to the European Commission Basket-of-Products Indicator

The European Commission (environmental) Life Cycle Indicators are a series of indicators that combine production, consumption and trade data, territorial resource use and emissions statistics, and process-based environmental LCA data for products and services. The indicators are intended to provide a comprehensive resource and environmental impact profile of production and consumption for the EU-27 and Member States (EC 2012). The indicators include a Resource Efficiency indicator, a Basket of Products (BoP) indicator, and a Waste Management indicator, with results reported using the 14 environmental life cycle impact assessment methods recommended by the International Reference Life Cycle Data System (EC 2010): climate change, ozone depletion, eco-toxicity – freshwater, human toxicity – cancer effects, human toxicity – non-cancer effects, particulate matter/respiratory inorganics, ionising radiation – human health effects, photochemical ozone formation, acidification, eutrophication – terrestrial, eutrophication – aquatic, resource depletion – water, resource depletion – fossil, and land use. The Resource Efficiency indicator monitors the overall resource use and environmental impacts of apparent consumption in the EU-27 and Member States by combining statistical data for overall territorial resource use and emissions with life cycle inventory data for imported and exported products. The Basket of Products indicator monitors the resource use and environmental impacts attributable to the consumption of an average EU-27 citizen based on a sub-set of representative products in five key demand categories: nutrition, shelter, consumer goods, mobility and services, taking into account production, use, and end-of-life stages. The Waste Management indicator monitors the environmental impacts attributable to the management of the most relevant EU-27 waste streams.

Towards the goal of constructing an integrated sustainability assessment framework for evaluating and monitoring the efficacy of EC policy in realizing sustainability objectives, Pelletier *et al.* (2013a) proposed a conceptual basis for the "European Sustainability Footprint" (ESF). The proposed ESF will extend the EC (environmental) Life Cycle Indicators to include parallel life-cycle based social and economic indicators such that policy makers can simultaneously consider the environmental, social, and economic dimensions of policy alternatives based on a common, life cycle approach. The ESF will also provide for assessing indicator results against sustainability thresholds and targets, in order to support the twin EC policy objectives of (1) green growth and (2) ensuring that the EU economy develops so as to respect resource constraints and planetary boundaries (Pelletier *et al.* 2013a).

As a first example of how SHDB social risk data can be combined with statistical data in order to provide social indicators in parallel to the EC (environmental) Life Cycle Indicators for eventual use in the ESF, we also evaluate the social risks attributable to the representative products and consumption levels described for the current EC Basket-of-Products indicator. This is accomplished by using Eurostat trade data and the LCA software-based version of the SHDB to model the product supply chains of the representative products considered in the BoP. Although the BoP takes into account production, use, and end-of-life stages, we consider here the production stage only for illustrative purposes. However, we also discuss extension of the current model to include the use and end-of-life stages. We also include only three of the five demand categories in the current analysis; nutrition, consumer goods, and mobility.

Since the environmental BoP is calculated in terms of physical units (i.e. actual number or kgs of representative products), it was first necessary to re-express these physical units in terms of value (i.e. euros). The current BoP uses a combination of production statistics (from Prodcom) and trade (from ComEx) data. For the purpose of the current analysis, we extracted apparent per capita consumption data from the BoP life cycle inventory, as well as the % attributable to domestic versus extra-territorial production. We were able to calculate value per kg or item for most of the representative products based on the inventory data available in the BoP prototype. We assumed that consumer prices are equivalent to export prices. The necessary data were not available in the BoP prototype, however, for food items other than beer, coffee and vegetable oils, so an alternative strategy was necessary.

Eurostat Comex data is available both per 100 kgs of traded commodity, and in euros. This allows for re-expressing the data in euros/kg. For the remaining food items, we made the simplifying assumption that intra-territorial trade patterns provide a reasonable proxy for the country-of-origin profile for consumption of domestically-produced food items, and that intra-territorial import values are representative of consumer prices. It should also be noted here that the current BoP inventory assumes domestic production of all food products other than vegetable oils. We have similarly adopted this assumption for the current analysis, but recommend accounting for imported food items in future analyses. For a description of the GTAP mapping we employed for the representative products, apparent per capita consumption in each demand category, % attributable to intra-territorial versus extra-territorial production, price data and data sources, see Appendix E.

3. RESULTS

3.1 Social Risk Profiles of EU-27 Trade: Country-of-Origin Versus Life Cycle-Based Assessments

Although we compute results for all 115 sub-indicators considered, for the sake of comparability between the country-of-origin and the life cycle based-assessments of social risk attributable to EU-27 imports in 2010 (see 3.2), we present results per social theme, thematic area and as single scores based on the subset of sub-indicators and weights applied in the software version of the life cycle-based method only (see Appendix A). Figure 1 presents the weighted distribution of social risks (%) across the 17 social themes considered for total EU-27 trade (by value) in 2010 originating from either extra- or intra-territorial trading partners. In this and subsequent figures 2 through 15, panel A presents the results of the country-of-origin analysis, whereas panel B presents the results of the life-cycle based analysis (in later figures, these panels will refer to intra- and extra-territorial imports respectively). Evident here is the disproportionately large contribution to overall social risk attributable to the Injuries and Fatalities indicator in both analyses. This is strongly influenced by the high weighting for risk of fatalities relative to the weightings for the other social risks considered (a "very high risk" of fatalities has a weighing factor of 500 medium risk hour-equivalents compared to weightings of 10 for "very high risks" in most other indicator categories – see Appendix A). Also evident here is the much larger degree of social risk attributable to extra-territorial imports compared to intra-territorial imports, again for both analyses (almost 100% for the country-of-origin analysis and 83% for the life cycle-based analysis). This is particularly interesting given that the overall value of EU-27 imports in 2010 from extra-territorial trading partners (1.35411^{12} euros) contributes only 36.5% of the total 2010 import flows (4.00176^{12} euros) considered. Also of note here is that production of intra-territorial imports will, in some cases, include extra-territorial imported products as inputs to the production process. Figure 2 more clearly presents the shares of social risk attributable to extra- versus intra-territorial trade for each indicator and in each analysis by representing % share for each indicator.

Beyond these two general similarities, however, the analyses provide otherwise divergent results. First, the Injuries and Fatalities risk indicator is proportionately more important relative to the other risk indicators in the country-of-origin analysis (90% compared to 72% in the life cycle-based analysis). Although much smaller than for Injuries and Fatalities, estimated risk is none-the-less proportionately larger across all other indicators in the life cycle-based analysis. This is because risks are additive along supply chains in the life cycle-based analysis, and many of the social risks (for example, risks of child labour, forced labour, gender inequality, etc.) are often higher among third country trading partners than within the EU-27. In other words, risks experienced by all supply chain actors contributes to the cumulative total risk estimate, whereas the county-of-origin analysis only takes into account the risk profile of the sector from which the final product is derived.

Considering individual social themes, contributions from intra-territorial trading partners are negligible across indicators in the country-of-origin analysis for overall trade, but range from 9% for risk of Child Labour to 20% for risk of Injuries and Fatalities in the life cycle-based analysis. Again, this reflects the fact that the conditions associated with production of products within EU-27 Member States may be comparatively good (hence the minimal contribution of intra-territorial imports to estimated risk in the country-of-origin analysis), but may be

produced using material, energy, and service sector inputs from extra-territorial trading partners that are characterized by much higher levels of social risk. These risks only become evident when a life cycle approach to quantifying risk is employed.

Turning to single scores results at the sectoral level for total EU-27 imports in 2010, the results of the country-of-origin versus life cycle-based evaluations of social risks are even more divergent (Figure 3). Both the distribution of risks between sectors and the relative importance of extra- versus intra-territorial imports vary widely. For example, estimated single score social risk is highest for the Motor Vehicles and Parts sector in the country-of-origin analysis, with a majority share of risk associated with intra-territorial imports. This is largely because intra-territorial imports account for 86% of total imports in this sector. In contrast, the Oil sector is, by a considerable margin, the most important contributor in the life cycle-based evaluation. In the Wood Products sector, intra-territorial imports contribute 70% of estimated social risk for this sector in the country-of-origin analysis, but only 23% in the life cycle-based evaluation (Figure 4). Conversely, in the Paddy Rice sector, intra-territorial imports contribute 40% of estimated social risk for this sector in the country-of-origin analysis, but only 1% in the life cycle-based evaluation (Figure 4). Based on the country-of-origin analysis, the top ten sectors for social risks associated with total EU-27 trade are different (only 7 of 10 are common) from those indicated by the life cycle-based analysis (Table 4), ordered differently, and have different apparent contributions from extra- and intra-territorial imports. Interestingly, the overall % contribution of these top ten sectors to total estimated single score social risks is quite similar for the two analyses. This likely strongly influenced by two factors: the % by value that the ten sectors contribute to overall trade (71% for the country-of-origin analysis and 61% for the life cycle-based analysis); and the relative importance of Injuries and Fatalities in these sectors.

Table 4. Top ten sectors for single score social risk (by % contribution to overall social risk) attributable to EU-27 imports in 2010 from extra- and intra-territorial trading partners considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risk scores.

A	Country-of-Origin		
	Extra-	Intra-	Total
Motor vehicles and parts	2%	12%	15%
Machinery and equipment nec	8%	3%	11%
Chemical, rubber, plastic products	7%	4%	11%
Oil	9%	0%	9%
Ferrous metals	0%	4%	5%
Textiles	2%	2%	4%
Wearing apparel	2%	2%	4%
Paper products, publishing	1%	3%	4%
Metals nec	3%	1%	4%
Electronic equipment	2%	1%	3%
SUM	**36%**	**33%**	**69%**
B	**Life Cycle-Based**		
	Extra-	**Intra-**	**Total**
Oil	17%	0%	17%

Crops nec	8%	0%	8%
Machinery and equipment nec	5%	2%	7%
Metals nec	6%	1%	7%
Chemical, rubber, plastic products	4%	2%	6%
Textiles	5%	1%	6%
Electronic equipment	4%	1%	5%
Wearing apparel	4%	1%	4%
Food products nec	3%	1%	4%
Minerals nec	3%	0%	3%
SUM	**58%**	**9%**	**67%**

Considering single score results per euro spent on trade in each sector also presents highly divergent results between the country-of-origin and life cycle-based evaluations, as the influence of magnitude of trade flow is not a factor here (Figure 5). Per euro spent, the apparent contribution of intra-territorial imports is much more pronounced for the country-of-origin analysis compared to the life cycle-based analysis. For the country-of-origin analysis, contributions of intra-territorial imports to estimated single score social risk per euro spent in each sector ranges from 6% in the Meat Products Nec sector to 82% in the Ferrous Metals sector, with an average of 36% across sectors. In contrast, contributions of intra-territorial imports to estimated risk per euro spent in each sector ranges from 1.4% in the Paddy Rice sector to 51% in the Gas Manufactures sector, with an average of 15% across sectors for the life cycle-based analysis.

Based on the country-of-origin analysis, the top ten sectors for social risks per euro spent in each sector are different (only 6 of 10 are common) from those indicated by the life cycle-based analysis (Table 5), ordered differently, and have different apparent contributions from extra- and intra-territorial imports. Notable here is the much wider distribution in apparent social risk attributable to the highest risk sectors in the life cycle-based compared to the country-of-origin analysis.

Table 5. Top ten sectors for single score social risk per euro spent in each sector (by % contribution to the sum of social risk for 1 euro spent in each sector) attributable to EU-27 imports in 2010 from extra- and intra-territorial trading partners considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risk scores.

A	Country-of-Origin		
	Extra-	**Intra-**	**Total**
Processed rice	4%	2%	6%
Meat products nec	4%	0%	4%
Paddy rice	2%	2%	3%
Cereal grains nec	2%	2%	3%
Vegetables, fruit, nuts	2%	2%	3%
Oil seeds	2%	1%	3%
Sugar	2%	1%	3%
Wheat	2%	1%	3%
Bovine cattle, sheep and goats, horses	2%	2%	3%
Leather Products	2%	2%	3%

B	Life Cycle-Based		
	Extra-	Intra-	Total
Paddy rice	18%	0%	18%
Processed rice	13%	0%	14%
Crops nec	9%	0%	10%
Plant based fibers	9%	0%	9%
Sugar	6%	0%	6%
Forestry	3%	0%	3%
Vegetables, fruit, nuts	3%	0%	3%
Cereal grains nec	2%	0%	3%
Vegetable oils and fats	2%	0%	2%
Oil seeds	2%	0%	2%

Figures 6-10 depict the comparative % of risks for each social theme (i.e. Labour Rights and Decent Work, Human Rights, Healthy and Safety, Governance, and Community Infrastructure) and sector attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering country-of-origin or cradle-to-producer gate life cycle social risks scores. Figures 11-15 depict this same comparison per euro spent in each sector.

Figure 1A-B. Comparative % of social risks (in medium risk hour-equivalents (mrh-eq)) attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin social risk scores or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

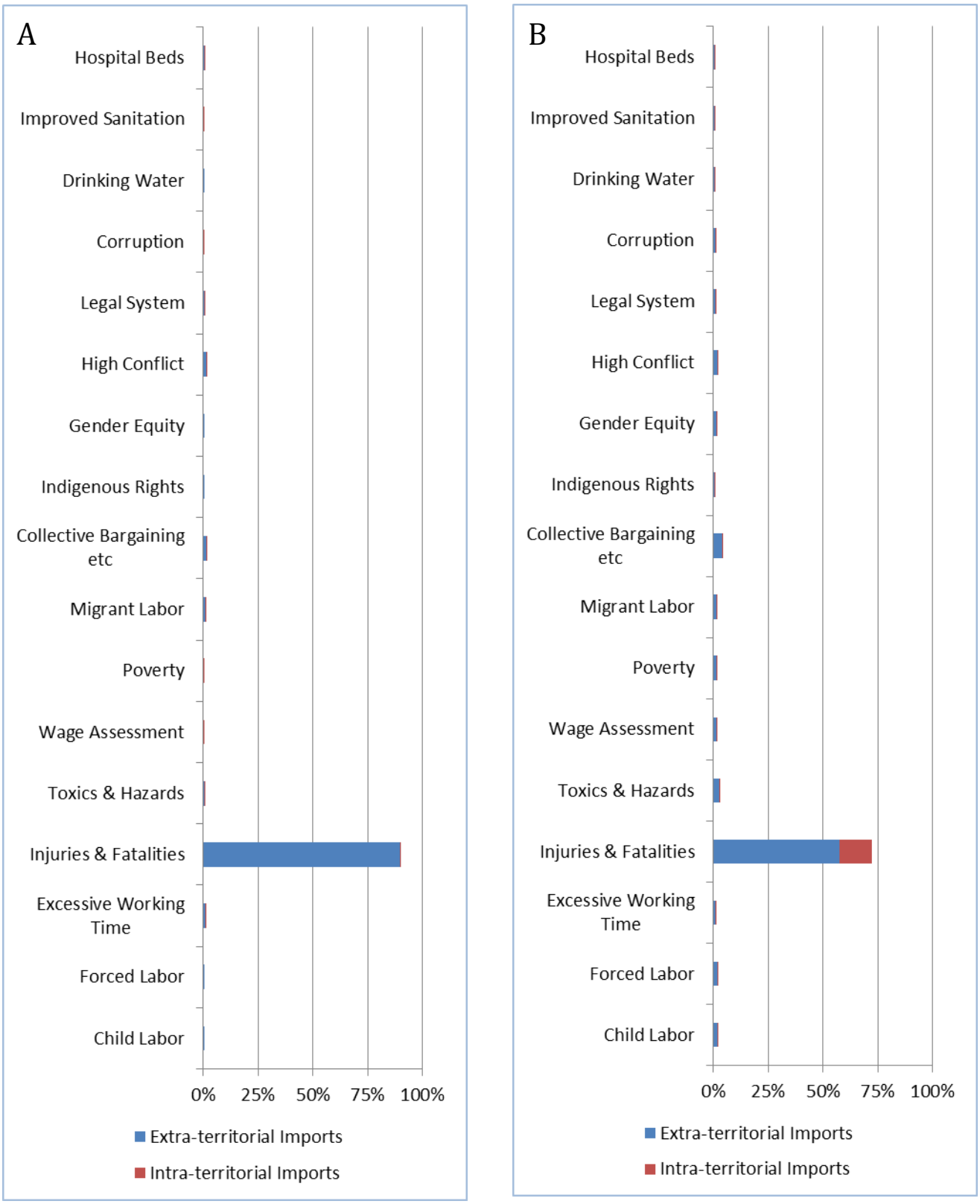


Figure 2A-B. % contribution to social risks (in mrh-eq) attributable to total EU-27 imports in 2010 from extra- and intra-territorial trade for each indicator considered based on (A) country-of-origin social risk scores or (B) cradle-to-producer gate life cycle social risks scores.

Figure 3A-B. Comparative % of social risks in each sector attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

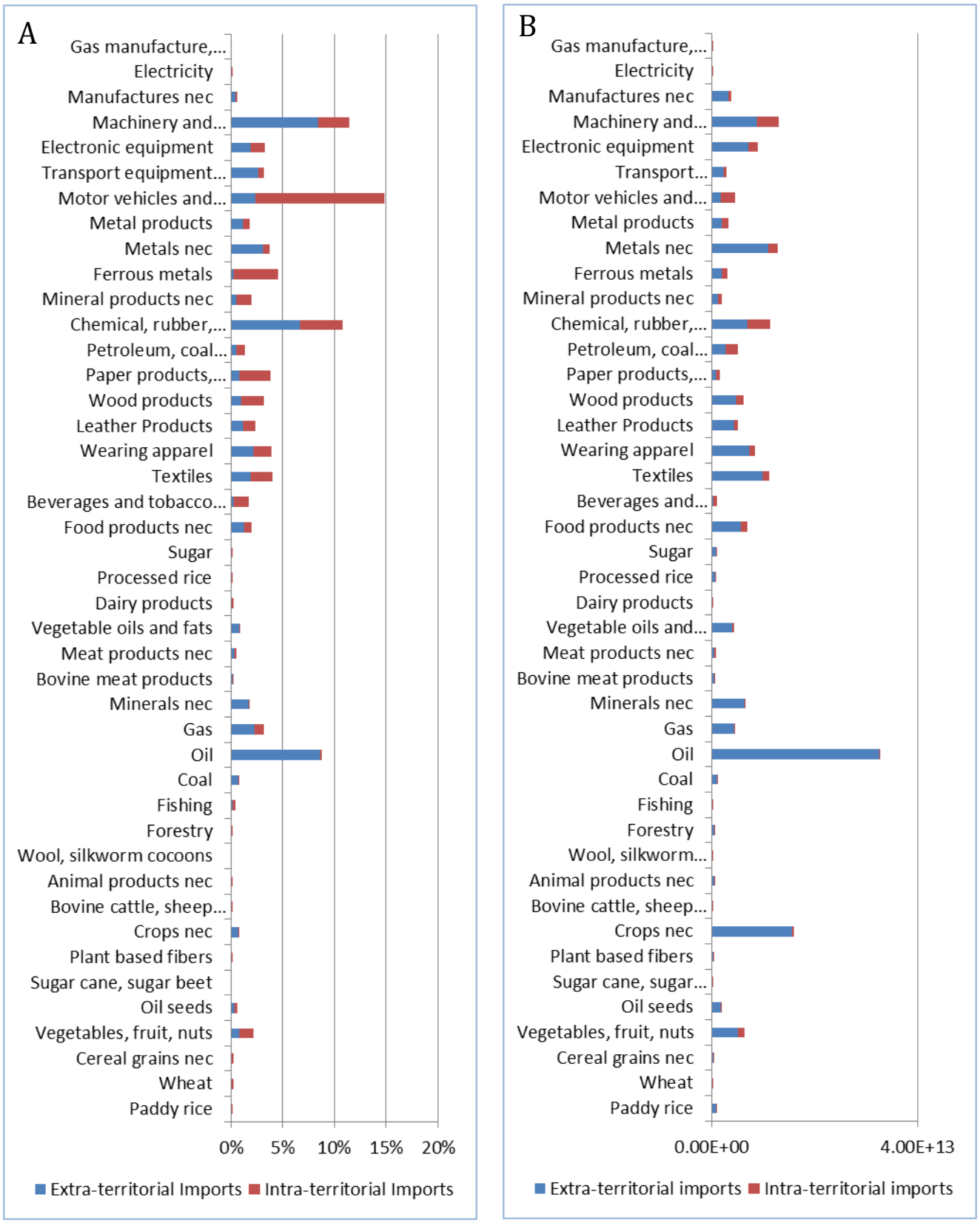
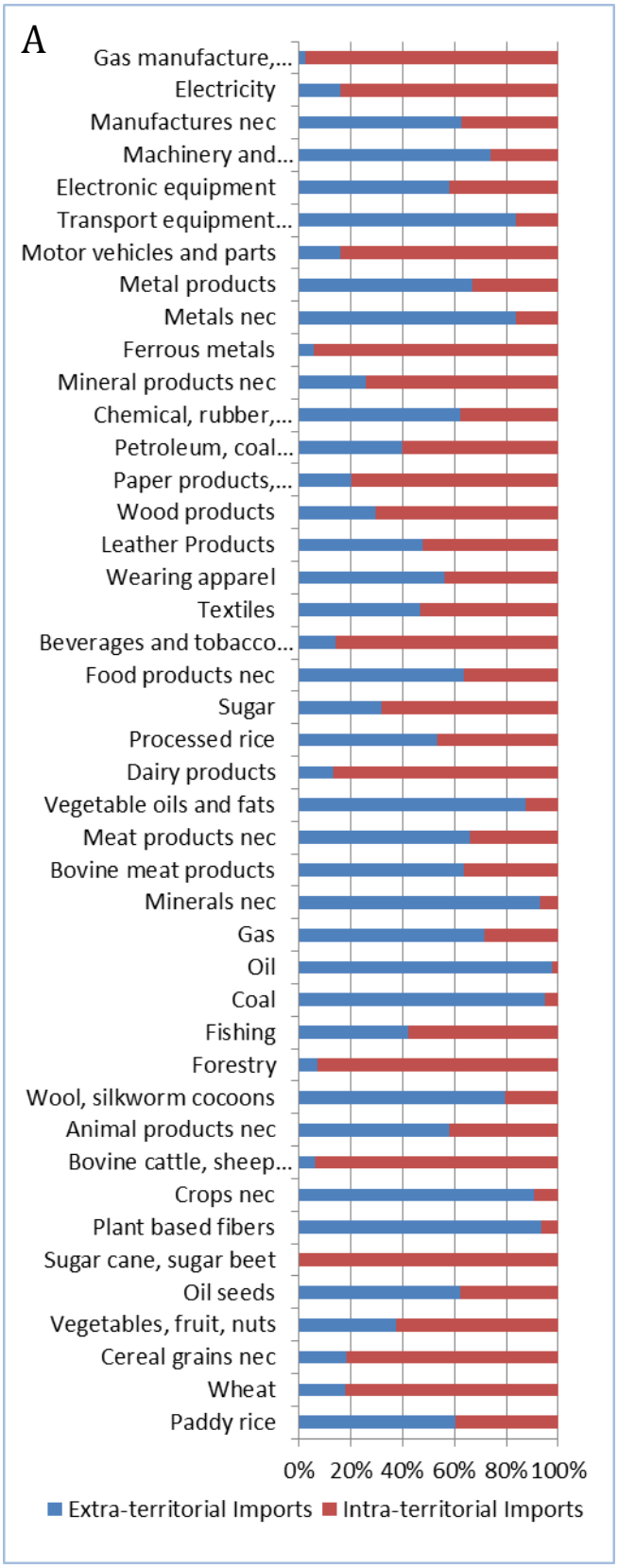


Figure 4A-B. Distribution (%) of single score social risks for total EU-27 intra- and extra-territorial imports for each sector in 2010 based on (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores.



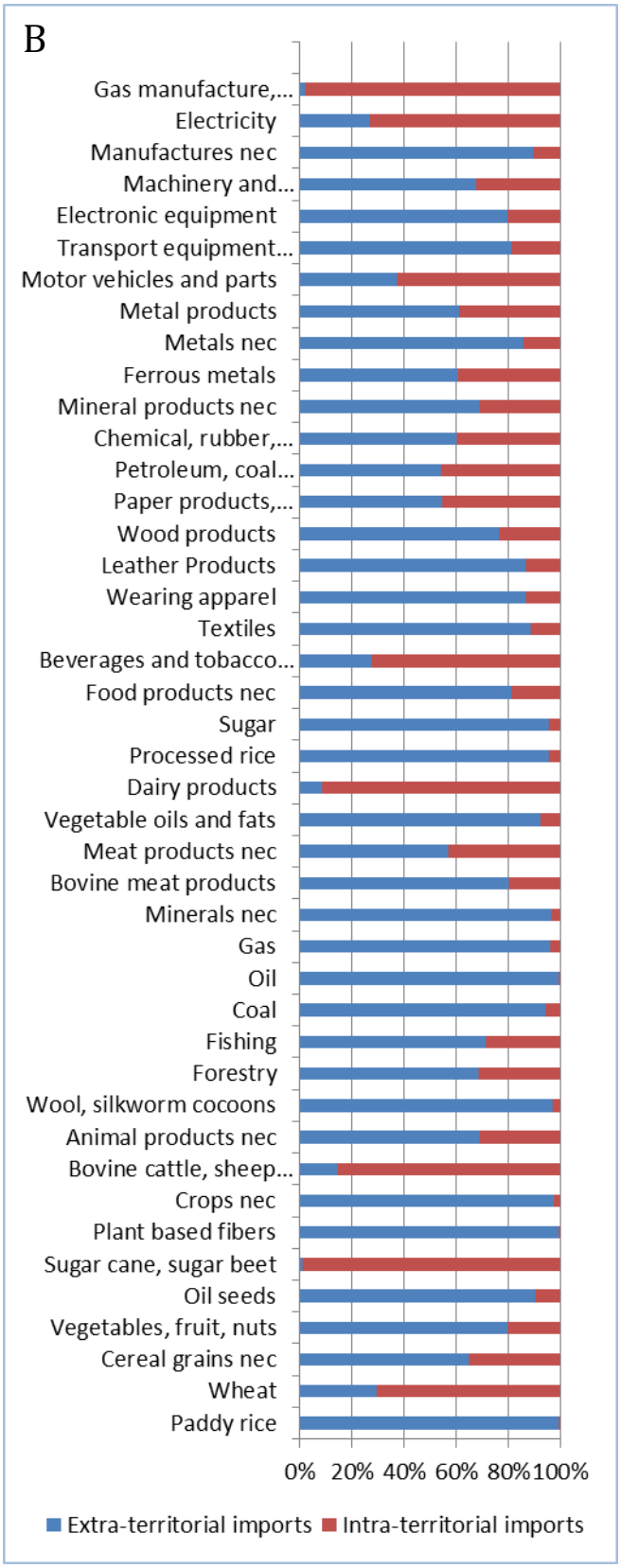


Figure 5A-B. Comparative % of social risks in each sector per euro of EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

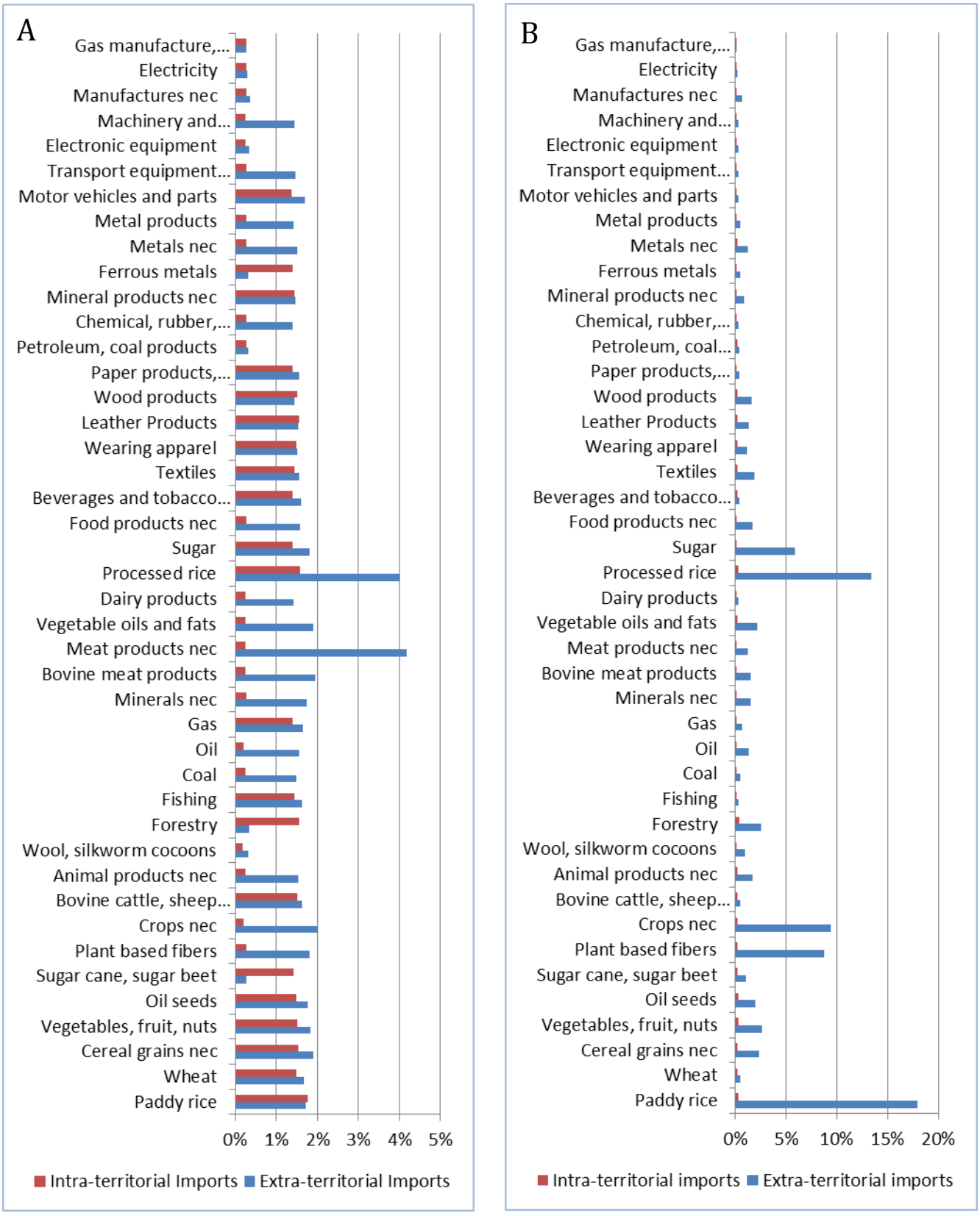


Figure 6A-B. Comparative % of Labour Rights and Decent Work risks in each sector attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

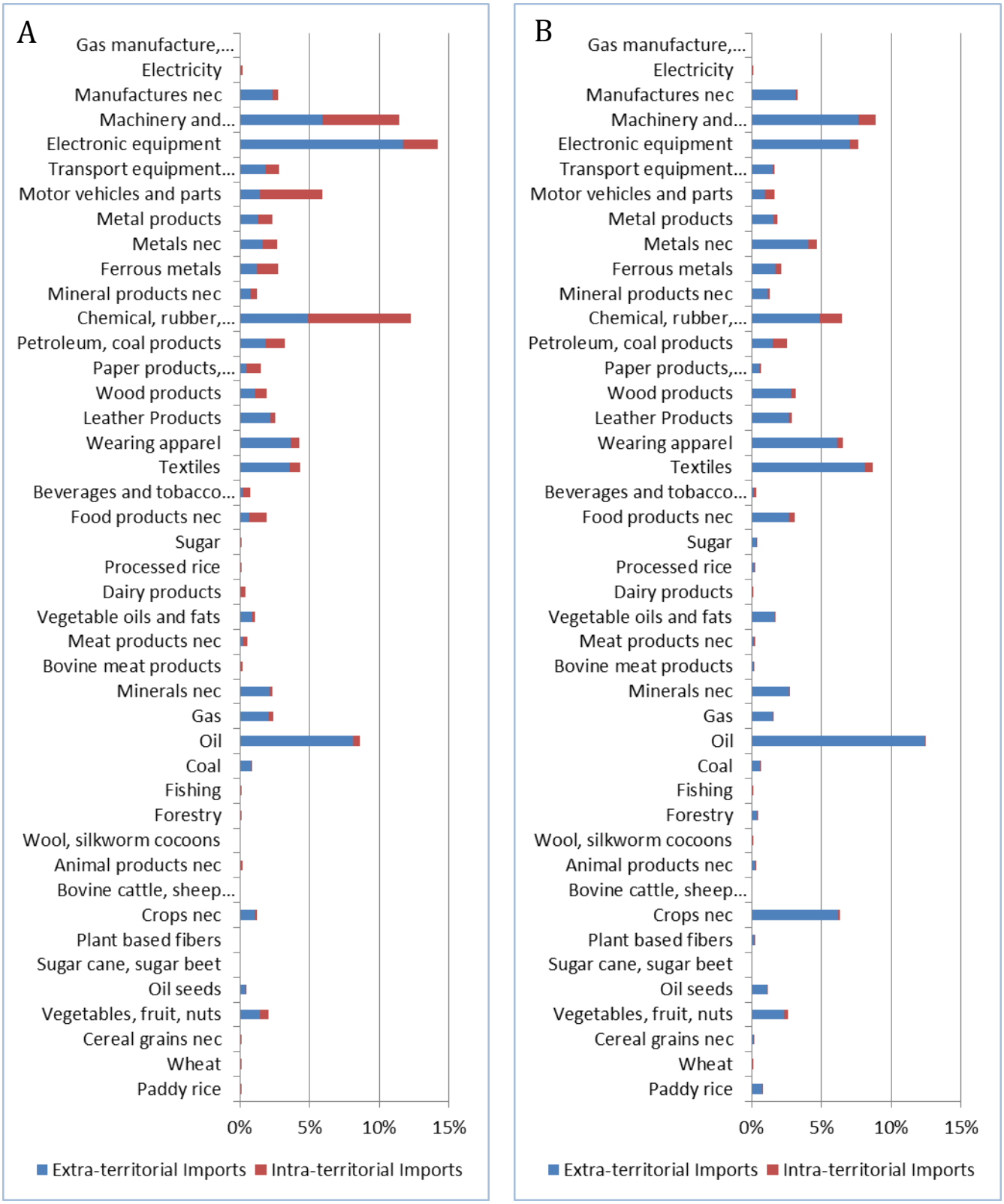
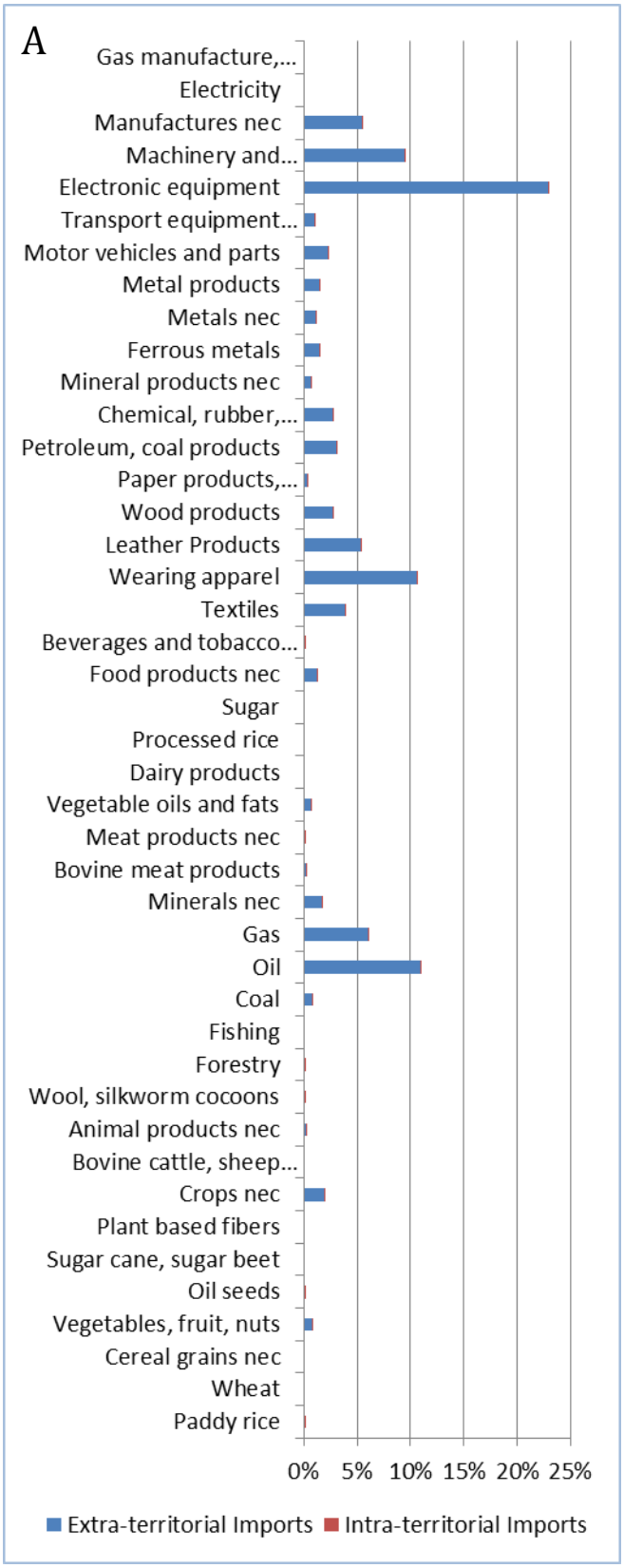


Figure 7A-B. Comparative % of Human Rights risks in each sector attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.



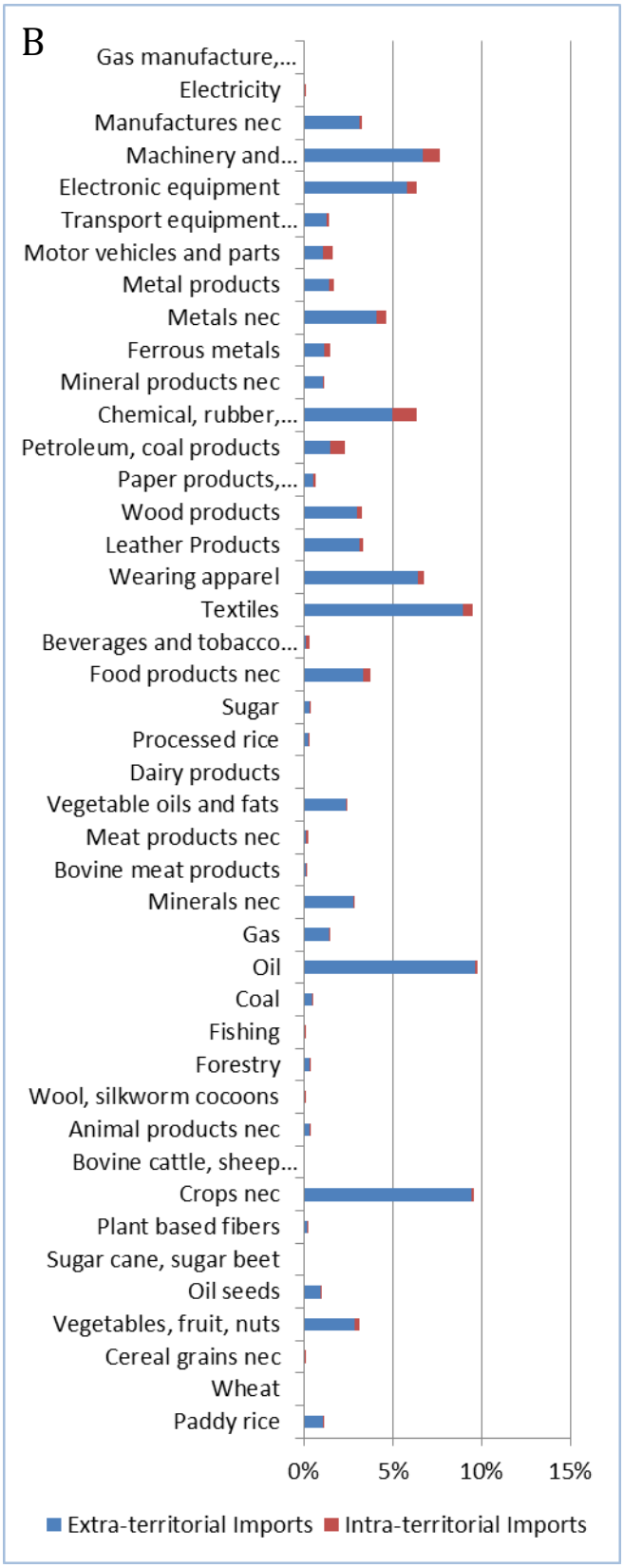


Figure 8A-B. Comparative % of Health and Safety risks in each sector attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

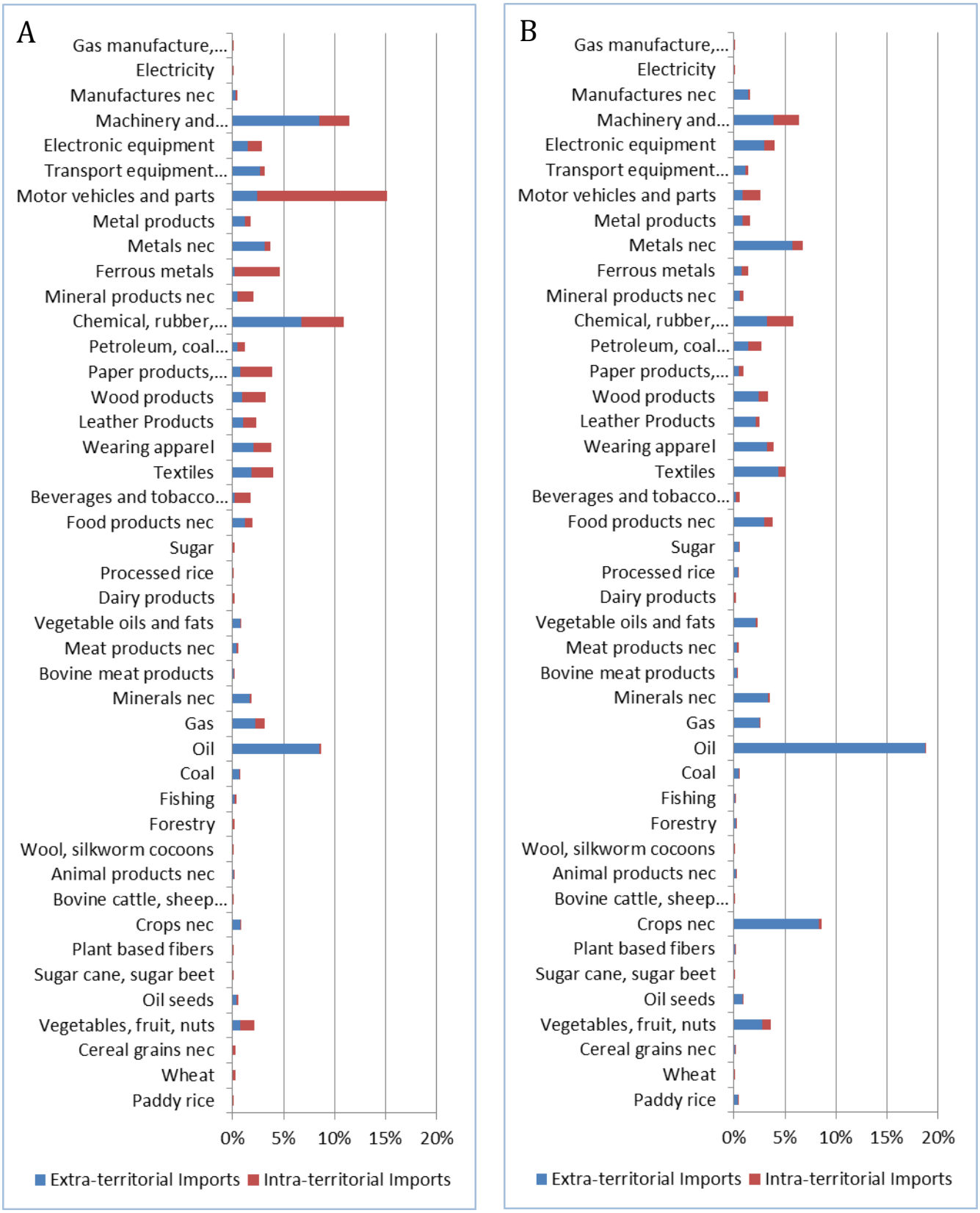


Figure 9A-B. Comparative % of Governance risks in each sector attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

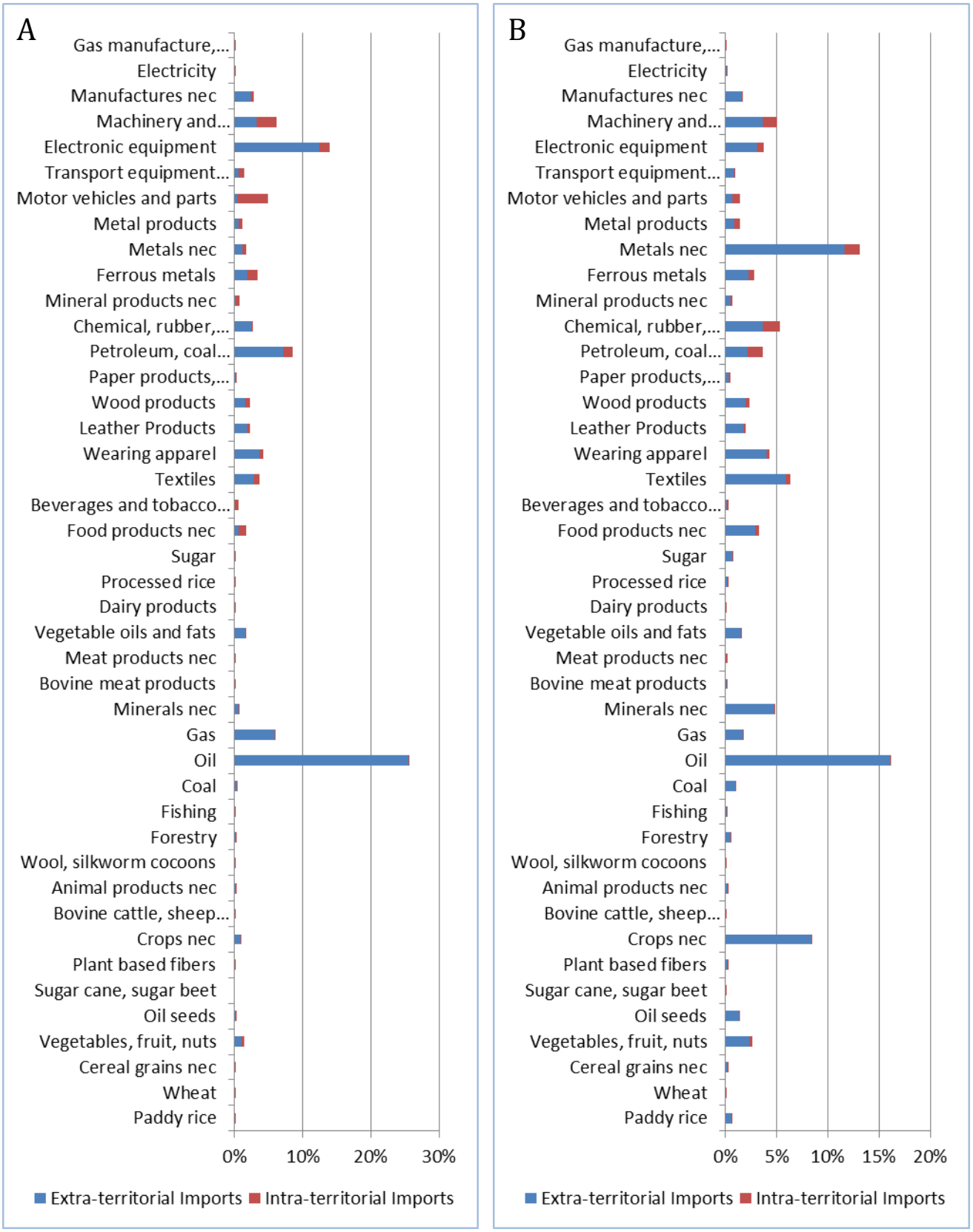


Figure 10A-B. Comparative % of Community Infrastructure risks in each sector attributable to total EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

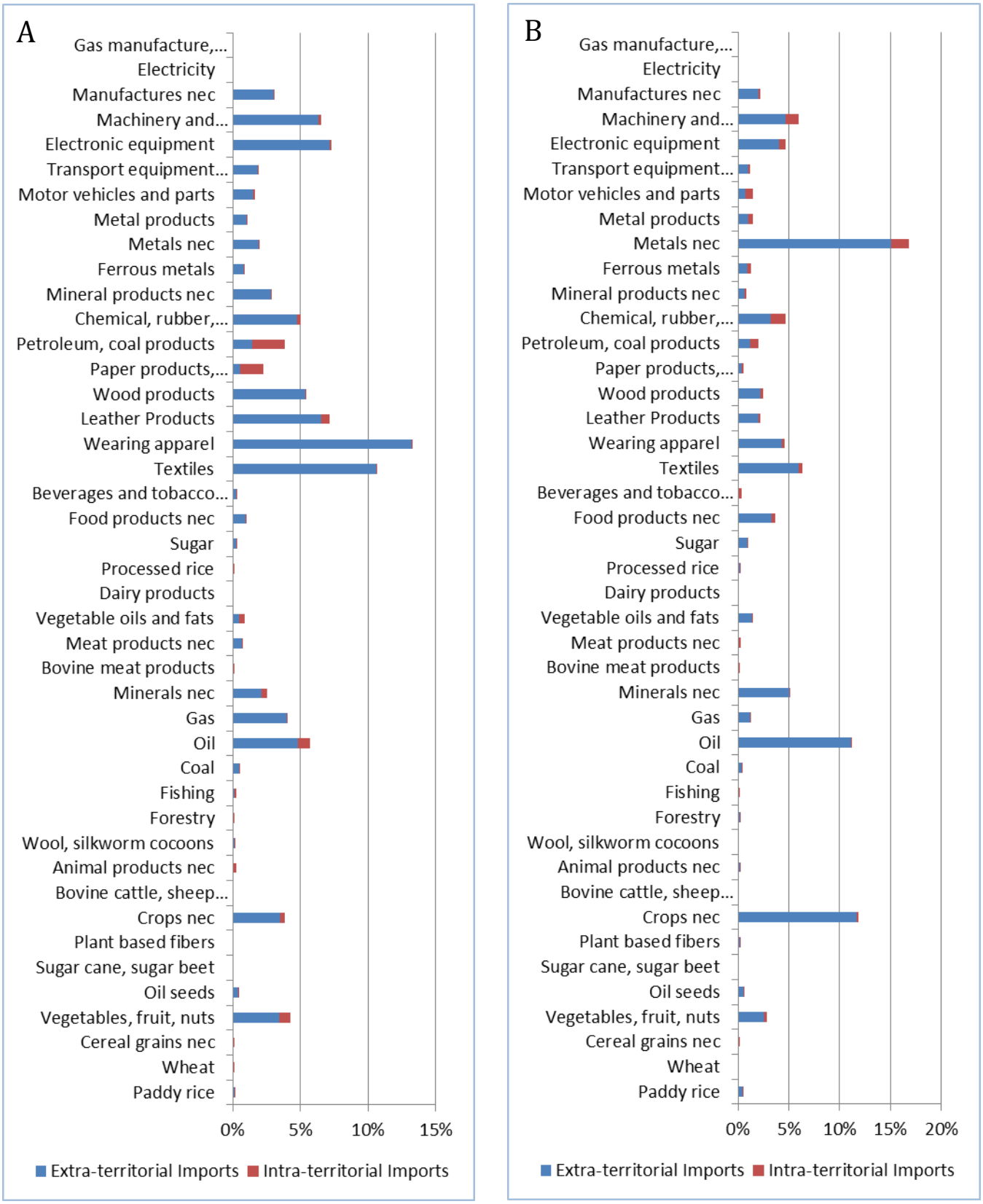
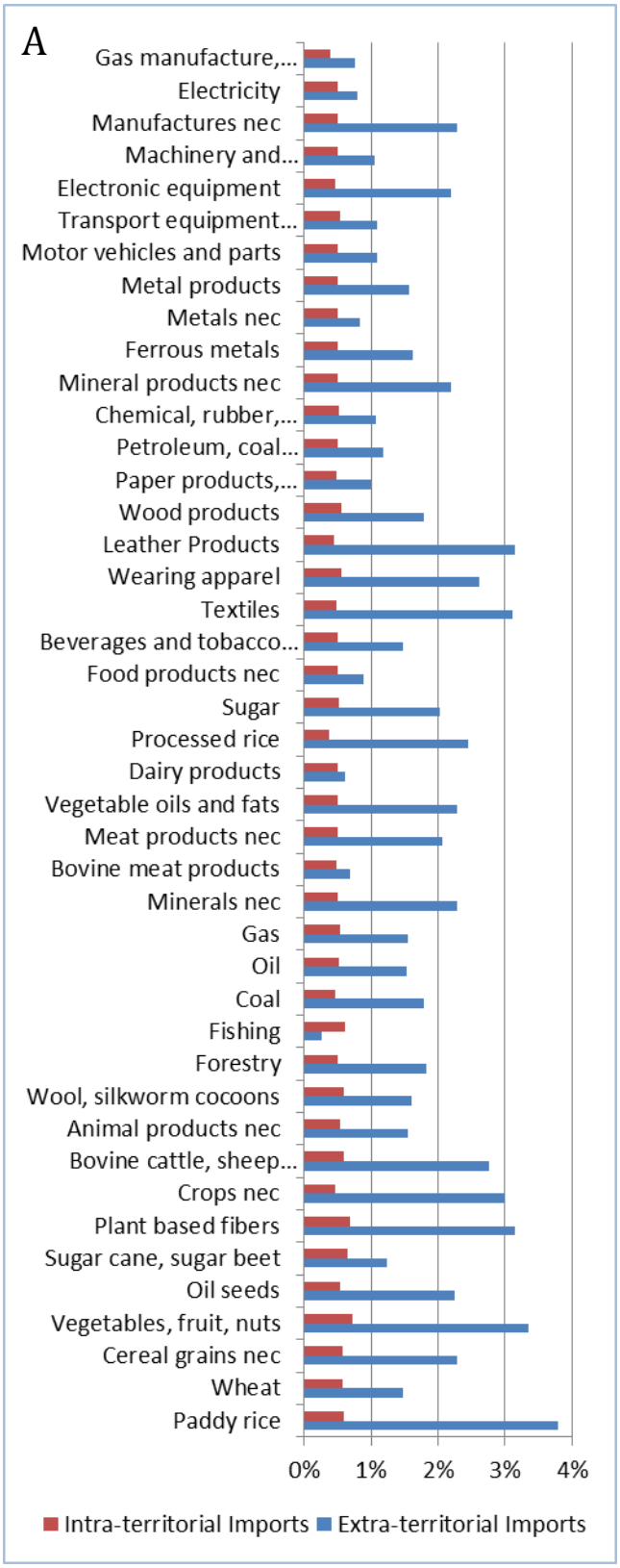


Figure 11A-B. Comparative % of Labour Rights and Decent Work risks per euro spent in each sector on EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.



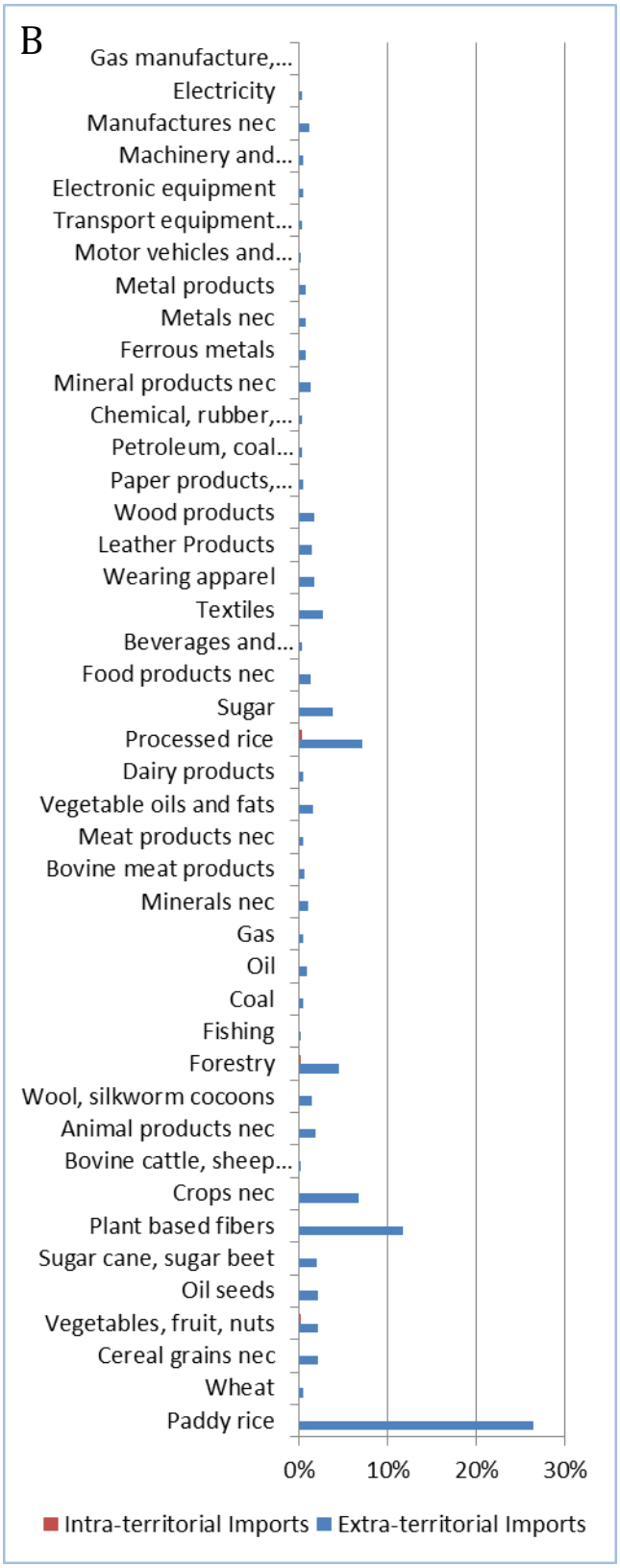


Figure 12A-B. Comparative % of Human Rights risks per euro spent in each sector on EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

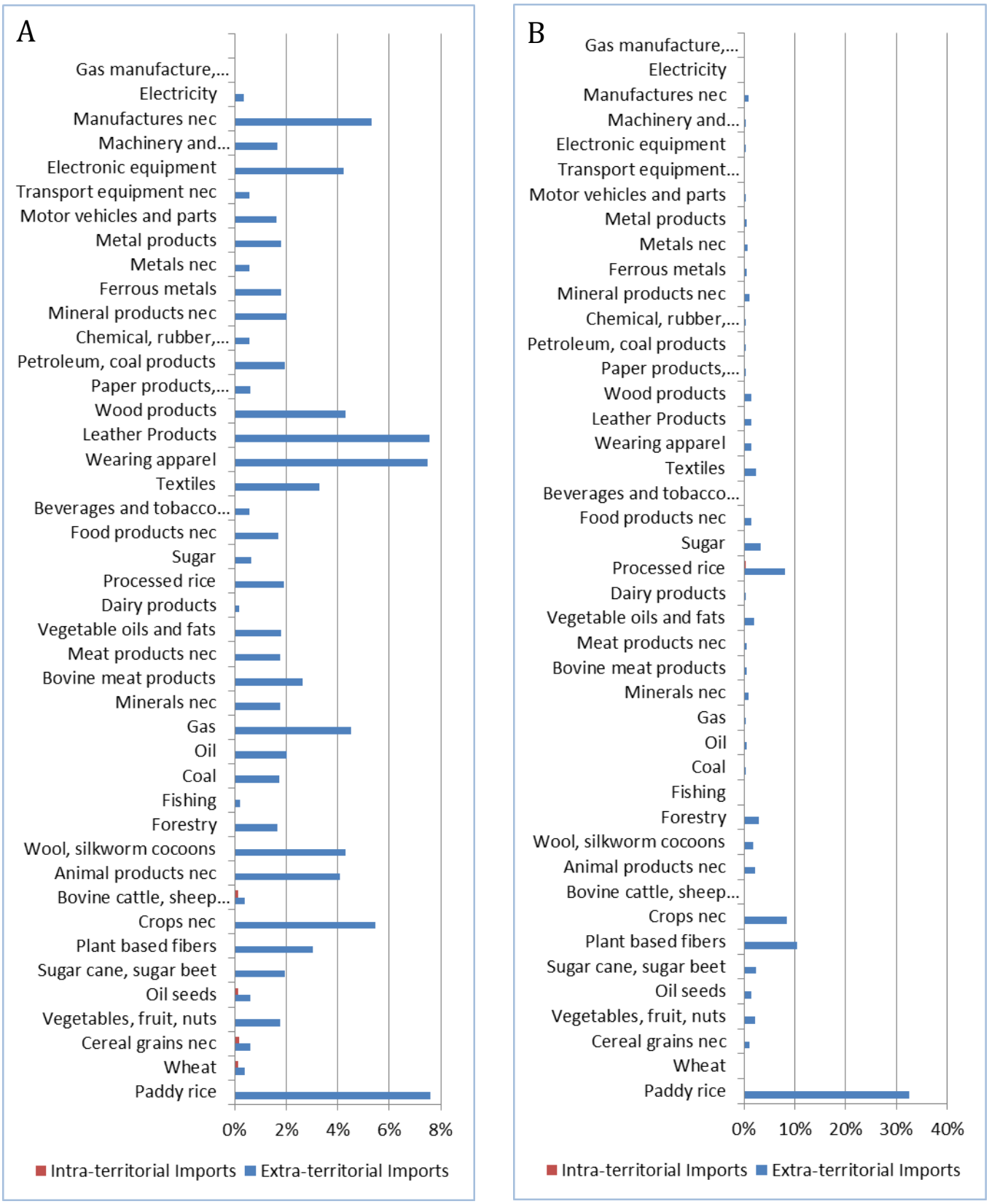


Figure 13A-B. Comparative % of Health and Safety risks per euro spent in each sector on EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

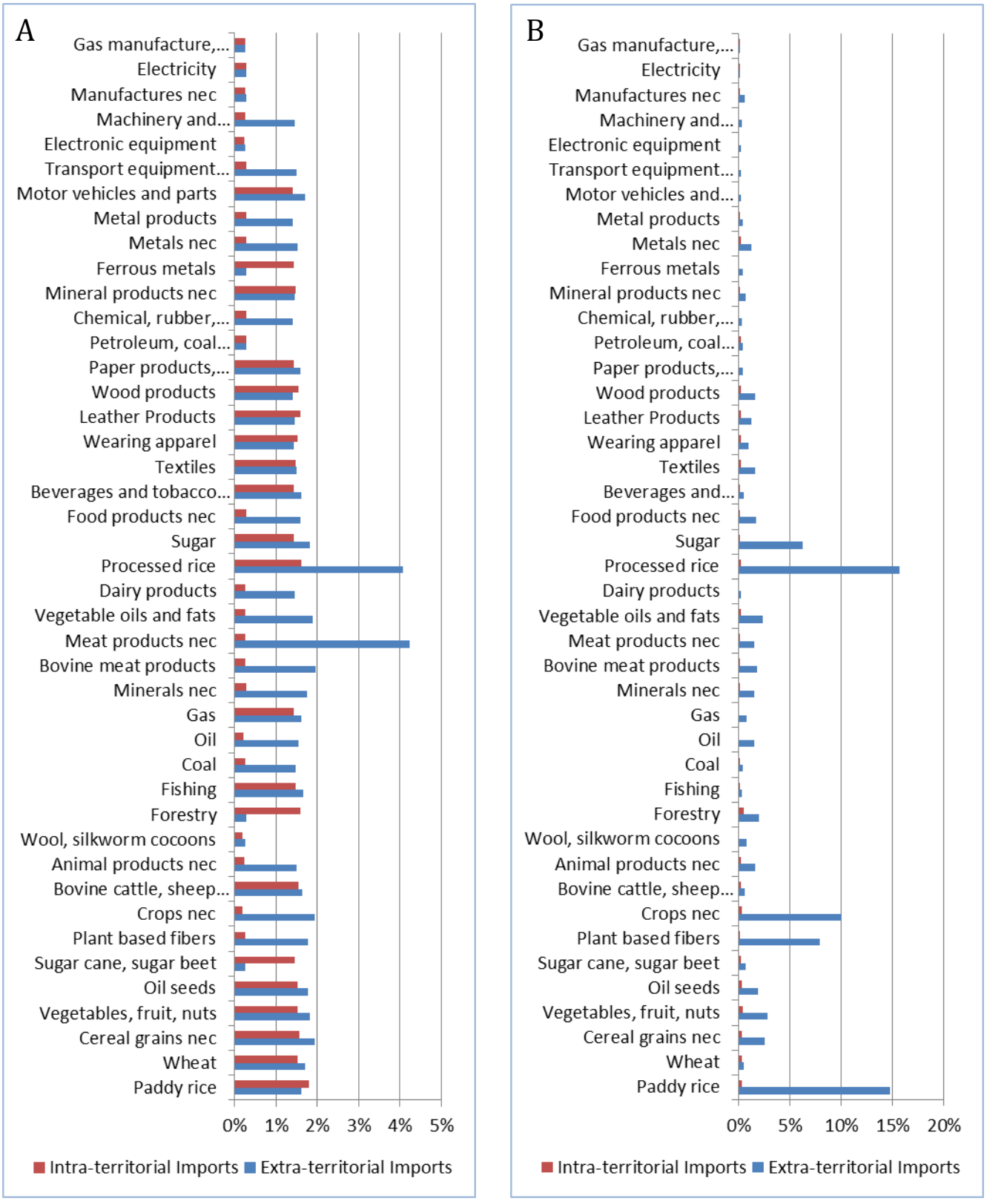


Figure 14A-B. Comparative % of Governance risks per euro spent in each sector on EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

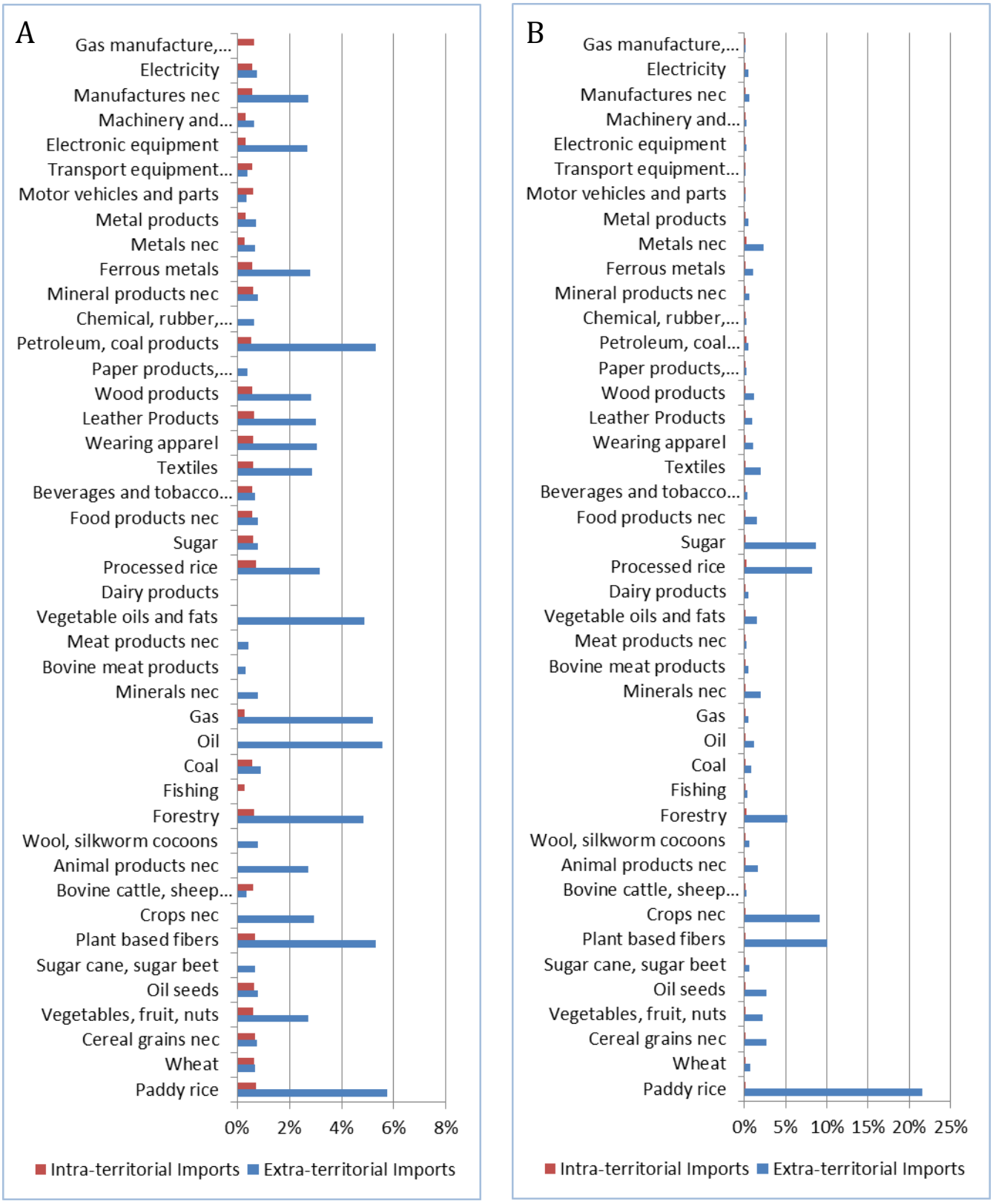


Figure 15A-B. Comparative % of Community Infrastructure risks per euro spent in each sector on EU-27 imports from extra- and intra-territorial trading partners in 2010 considering (A) country-of-origin or (B) cradle-to-producer gate life cycle social risks scores for each indicator considered.

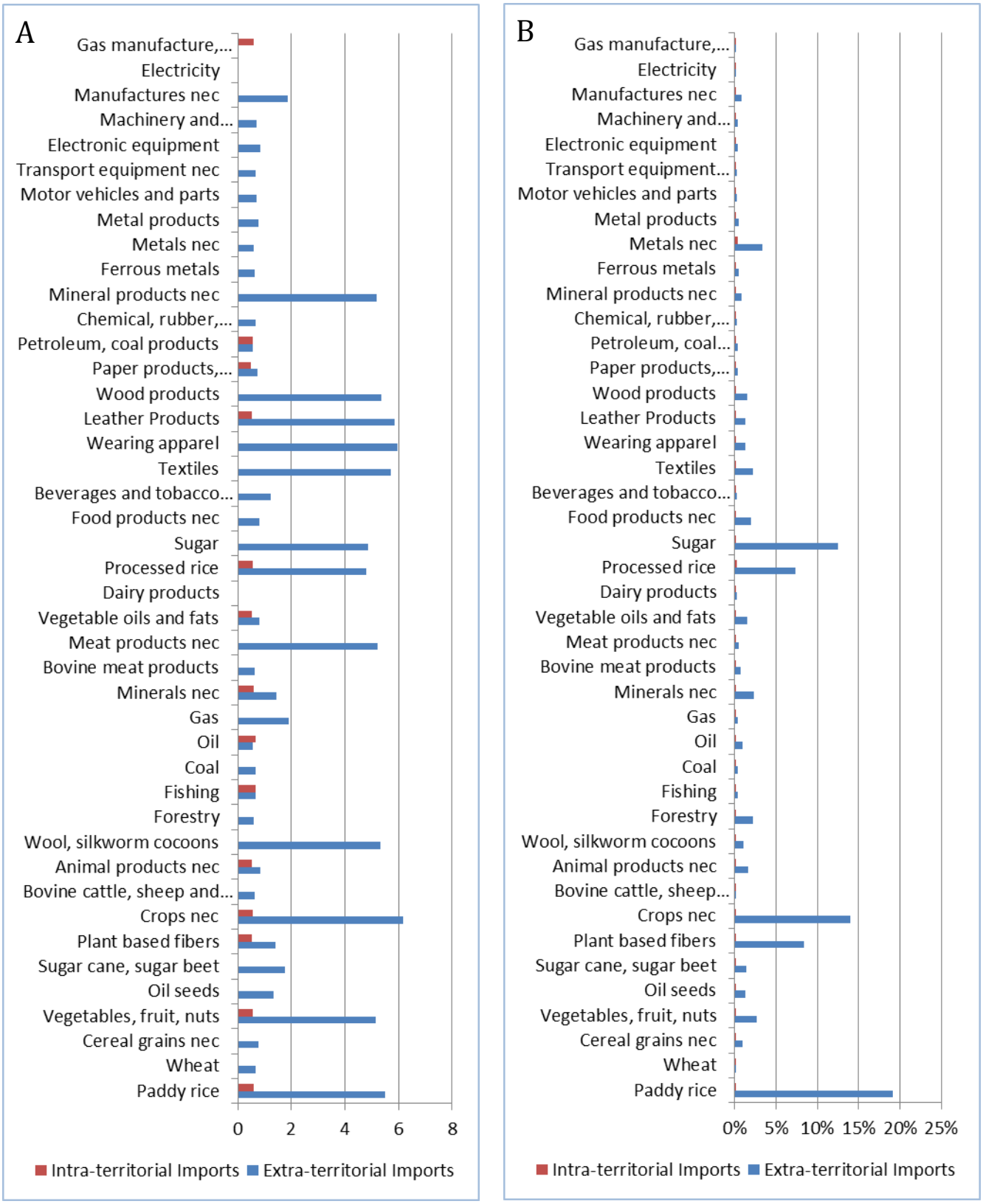
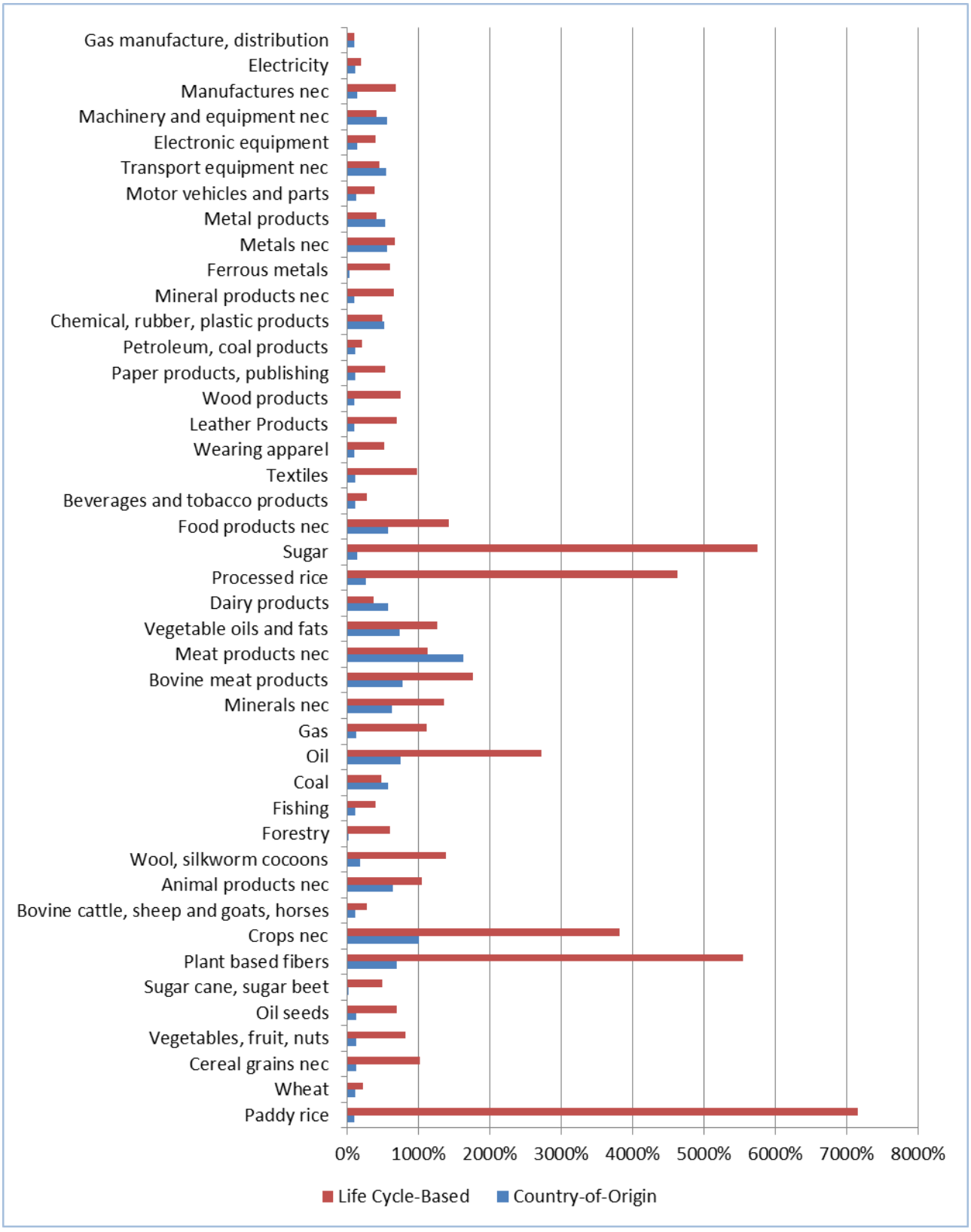


Figure 16 presents the externalization ratios for EU-27 trade per euro spent in each sector. These ratios provide a dimensionless indication of the single score social risk associated with products consumed in the EU-27 that are produced in the same sectors by intra- compared to extra-territorial trading partners. They effectively provide an indication of the extent to which importing specific products rather than producing them domestically creates the potential for persons in third countries to be exposed to social risk. It should be underscored here that this analysis does not attempt to quantify the social benefits of production neither domestically nor in third countries.

The externalization ratios calculated for the country-of-origin versus life cycle-based analyses are strikingly different. For the country-of-origin analysis, six sectors show a “negative” externalization ratio, suggesting that social risks for these imports are higher from intra-territorial trading partners compared to extra-territorial trading partners. In contrast, only one sector (Gas Manufactures and Distribution) shows a negative externalization ratio in the life cycle-based analysis (in this case because the single major extra-territorial trading partner is Switzerland, which has slightly lower social risk scores for this sector than do EU-27 Member States, on average). Calculated externalization ratios are also generally much lower for the country-of-origin analysis. They range from 20%-1680%, with an average of 331% across sectors, compared to a range of 93%-7148% and average of 1272% across sectors for the life cycle-based analysis (Figure 16).

Figure 16. Externalization ratios per euro spent on sectoral imports to EU-27 Member States from extra- compared to intra-territorial trading partners in 2010 based on a country-of-origin versus a life cycle-based analysis.



3.2 Detailed Results of the Life-Cycle Based Social Risk Assessment for EU-27 Trade

3.2.1 Single Score Assessment of Social Risk and Risks for Each Thematic Area

According to our life cycle-based assessment of total social risk associated with intra- and extra-territorial imports to EU-27 Member States across 17 indicators, the estimated risk associated with total imports (valued at 3.71[12] euros) in 2010 was equivalent to 1.9[14] medium risk hour equivalents. In other words, taking into account all of the supply chain worker hours required globally in support of producing the products that were imported to EU-27 Member States, there was an average potential risk of social impacts for one or more of the indicators considered of 5.12 medium risk hour equivalents per euro spent (with some "double counting" do to the use of extra-territorial imports in domestic production of intra-territorially traded products). This risk was unequally distributed between the supply chains of intra- and extra-territorial trading partners, indicators, and sectors.

Table 6 lists the top ten contributing countries for single score social risk, taking into account all supply chain activities, for intra-territorial, extra-territorial, and total imports to the EU-27 in 2010. For intra-territorial imports, 55% of supply chain social risks are concentrated in the top ten contributing countries, 35% of which actually occurs within the EU-27. For extra-territorial imports, 68% of single score social risk is attributable to the top ten contributing countries, of which Angola, China and Mozambique together contribute 37%. These three countries are also the top three contributors in terms of single score social risks associated with total imports in 2010, together accounting for 34% of risk. Only 17% of overall risks for total imports is attributable to activities that occur within EU-27 countries. This is largely attributable to Health and Safety risks (see Section 3.2.1).

Table 6. Top ten countries for concentration of supply chain activities contributing to single score social risk associated with intra-territorial, extra-territorial, and total imports to EU-27 Member States in 2010.

Intra-territorial Imports		Extra-territorial Imports		Total Imports	
Country		**Country**		**Country**	
RO	10%	AO	15%	AO	13%
PL	8%	CN	12%	CN	11%
MZ	7%	MZ	10%	MZ	10%
ES	7%	IN	7%	IN	6%
AO	5%	VN	6%	VN	5%
CN	4%	ID	4%	ID	4%
BE	4%	DZ	3%	DZ	3%
DZ	3%	KZ	3%	KZ	3%
IT	3%	BR	3%	BR	3%
GB	3%	PK	3%	PK	3%
TOTAL	55%		68%		61%

As noted previously, the majority of total estimated social risk is associated with the risk of Injuries and Fatalities (72%) social theme in the supply chains of imported commodities, followed by Collective Bargaining

etc. (i.e. risk that a country lacks or does not enforce collective bargaining rights, freedom of association, or right to strike) (4.7%), Toxic and Hazards (3%), Forced Labour (2.3%), Child Labour (2.1%) and High Conflict (2.1%) (Figure 1B). This large attribution of risk to the Injuries and Fatalities indicator is strongly influenced by the high weighting factor applied to risk of fatalities relative to the other risk indicators. Social risks for total imports are also disproportionately attributable to extra-territorial imports (83%) (Figure 2B). Considering the distribution of single score social risk across the 43 GTAP sectors considered, the largest share of total risks is attributable to the Oil sector (17.2%), followed by Crops nec (8%), Machinery and Equipment nec (7%) and Metals nec (7%). The top ten contributing sectors account for 67% of the total estimated social risk (Table 4). These results are strongly influenced both by the % by value that these sectors contribute to total imports, as well as the risk of Injuries and Fatalities in these sectors. Although extra-territorial imports account for the majority of risk overall, the proportion of social risk attributable to extra-versus intra-territorial trading partners at the sectoral level is highly variable. In some sectors, such as the Sugar Cane, Sugar Beet sector, Gas Manufacture, Distribution sector and Dairy Products sector, contributions to total risk from intra-territorial imports are higher. Again, this is largely due to the high % by value of trade flows attributable to intra-territorial versus extra-territorial imports in these sectors (Figures 3B, 4B). This becomes evident when comparing risks per euro of products imported for each sector (Figure 5B). Here, the highest life cycle single score social risks per euro spent in each sector are attributable to imports from the Paddy Rice, Processed Rice, Crops nec, Plant-based Fibres, and Sugar sectors.

In light of the highly aggregated nature of single score results, which are strongly influenced by weighting factors and also mask the considerable complexity and heterogeneity of underpinning information, it is useful to also examine the magnitude and distribution of social risk at less aggregated levels. Social risks for different thematic areas and social themes may vary between sectors, along with the relative importance of intra- compared to extra-territorial imports for each risk indicator and sector. Figures 6B-10B depict the distribution of social risks across sectors for each of the five thematic areas considered (i.e. Labour Rights and Decent Work; Human Rights; Health and Safety; Governance; and Community Infrastructure) for total EU-27 imports from extra- and intra-territorial trading partners in 2010. Figures 11B-15B depict the same distribution per euro spent on imports from each sector. Table 7 summarizes the % of risks contributed by the top ten sectors for each thematic area. Table 8 summarizes the actual risks (in mrh-eqv) per thematic area per euro spent in each of the highest risk sectors.

For total extra-territorial imports, seven of the top-ranked sectors for single score social risks are similarly found in the top ten lists across scores for all five thematic areas (the only differences being the presence/absence of the Wood Products, Minerals nec and Food Products sectors for some themes). The Oil sector figures as the top contributor to single score social risk, as well as in four of the five social themes (it ranks second in the Community Infrastructure theme only). In total, these ten sectors contribute 70-77% of the risks for each social theme attributable to EU-27 imports from extra-territorial trading partners in 2010. Of this, the majority is related to Health and Safety risks (73%), in particular Injuries and Fatalities. Risks related to Labour Rights and Decent Work is second at 17%, followed by Human Rights (4.7%), Governance (2.7%) and Community Infrastructure (2.5%) (Table 7).

For total intra-territorial imports, the Chemical, Rubber and Plastic Products sector takes the place of the Oil sector as the top contributor to social risks. Six of the ten top single risk score sectors are also common across all of the social themes. These sectors contribute 68-77% of total risk for each social theme. Again, the majority is related to Health and Safety risks (85%), followed by Labour Rights and Decent Work (9.5%). Only a very small fraction of risk is attributable to the other social themes (Table 8).

Per euro spent in each sector, the Paddy Rice sector has the highest apparent single score social risk, as well as for all social themes other than one (where processed rice ranks first) for extra-territorial imports. Seven of the ten top single risk score sectors per euro spent are also common across all social themes. These top ten sectors contribute 72-77% of the risk across social themes per euro spent (Table 8).

For intra-territorial imports, rankings between sectors for risks per euro spent are more variable than for extra-territorial imports. Only five of the top ten single risk score sectors are common across all five social themes. Whereas order of magnitude differences were observed between the degree of risk attributable to the highest versus the 10th highest risk sectors for extra-territorial imports, difference are of the same order of magnitude for intra-territorial imports. The overall level of risk per euro spent across the top ten ranking sectors for intra-territorial imports is also an order of magnitude less than that observed for extra-territorial imports (Table 8).

Table 7. Contributions to total social risk attributable to EU-27 imports in 2010 for the top ten contributing sectors in each social theme.

A		EXTRA-TERRITORIAL IMPORTS									
Single Score		**Labor Rights & Decent Work**		**Health and Safety**		**Human Rights**		**Governance**		**Community Infrastructure**	
Oil	20.7%	Oil	13.8%	Oil	23.4%	Oil	10.6%	Oil	18.4%	Metals nec	16.9%
Crops nec	9.9%	Textiles	9.1%	Crops nec	10.4%	Crops nec	10.4%	Metals nec	13.3%	Crops nec	13.1%
Metals nec	7.0%	Machinery and equipment	8.6%	Metals nec	7.2%	Textiles	9.8%	Crops nec	9.5%	Oil	12.5%
Textiles	6.3%	Electronic equipment	7.8%	Textiles	5.4%	Machinery and equipment	7.3%	Textiles	6.7%	Textiles	6.7%
Machinery and equipment	5.6%	Crops nec	7.0%	Machinery and equipment	4.8%	Wearing apparel	7.1%	Minerals nec	5.4%	Minerals nec	5.7%
Wearing apparel	4.7%	Wearing apparel	6.8%	Minerals nec	4.2%	Electronic equipment	6.4%	Wearing apparel	4.5%	Machinery and equipment	5.2%
Electronic equipment	4.5%	Chemical, rubber, plastic products	5.5%	Chemical, rubber, plastic products	4.0%	Chemical, rubber, plastic products	5.5%	Machinery and equipment	4.1%	Wearing apparel	4.8%
Chemical, rubber, plastic products	4.3%	Metals nec	4.6%	Wearing apparel	4.0%	Metals nec	4.5%	Chemical, rubber, plastic products	4.1%	Electronic equipment	4.5%
Minerals nec	4.0%	Manufactures nec	3.5%	Food products nec	3.7%	Food products nec	3.7%	Electronic equipment	3.5%	Food products nec	3.7%
Food products nec	3.6%	Wood Products	3.1%	Electronic equipment	3.6%	Leather products	3.5%	Food products nec	3.4%	Chemical, rubber, plastic products	3.6%
% of Total mrh-eqv for top 10 sectors	70.6%		69.9%		70.8%		68.8%		73.0%		76.8%
B		**INTRA-TERRITORIAL IMPORTS**									
Single Score		**Labor Rights & Decent Work**		**Health & Safety**		**Human Rights**		**Governance**		**Community Infrastructure**	
Chemical, rubber, plastic products	13.5%	Chemical, rubber, plastic products	14.7%	Chemical, rubber, plastic products	13.3%	Chemical, rubber, plastic products	14.7%	Chemical, rubber, plastic products	14.0%	Metals nec	15.5%
Machinery and equipment nec	12.5%	Machinery and equipment nec	11.5%	Machinery and equipment nec	12.7%	Machinery and equipment nec	10.7%	Petroleum, coal products	12.0%	Chemical, rubber, plastic products	13.8%
Motor vehicles and parts	8.4%	Petroleum, coal products	9.8%	Motor vehicles and parts	8.8%	Petroleum, coal products	9.3%	Metals nec	11.8%	Machinery and equipment nec	11.8%
Petroleum, coal products	7.0%	Motor vehicles and parts	6.6%	Petroleum, coal products	6.5%	Metals nec	6.3%	Machinery and equipment nec	11.5%	Petroleum, coal products	7.6%
Metals nec	5.5%	Electronic equipment	6.2%	Electronic equipment	5.4%	Textiles	6.0%	Motor vehicles and parts	6.5%	Motor vehicles and parts	7.2%
Electronic equipment	5.5%	Metals nec	5.9%	Metals nec	5.1%	Electronic equipment	6.0%	Electronic equipment	5.5%	Electronic equipment	5.3%
Wood products	4.4%	Textiles	5.0%	Wood products	4.6%	Motor vehicles and parts	5.8%	Ferrous metals	4.7%	Metal products	4.3%
Food products nec	3.9%	Ferrous metals	4.2%	Vegetables, fruit, nuts	4.1%	Food products nec	4.1%	Metal products	4.3%	Ferrous metals	3.8%
Vegetables, fruit, nuts	3.9%	Wearing apparel	3.6%	Food products nec	4.0%	Ferrous metals	3.9%	Textiles	3.5%	Textiles	3.7%
Textiles	3.8%	Food products nec	3.5%	Metal products	3.7%	Wearing apparel	3.9%	Wood products	2.9%	Food products nec	2.8%
% of Total mrh-eqv for top 10 sectors	68.4%		70.9%		68.2%		70.7%		76.7%		75.8%

Table 8. Risks (in mrh-eq) by social theme attributable to EU-27 imports in 2010 per euro spent in the top ten contributing sectors.

A		EXTRA-TERRITORIAL IMPORTS									
Single Score		**Labor Rights & Decent Work**		**Health & Safety**		**Human Rights**		**Governance**		**Community Infrastructure**	
Paddy rice	2474	Paddy rice	612	Processed rice	1562	Paddy rice	251	Paddy rice	80	Paddy rice	59
Processed rice	1844	Plant based fibers	271	Paddy rice	1472	Plant based fibers	81	Plant based fibers	37	Crops nec	43
Crops nec	1296	Processed rice	166	Crops nec	998	Crops nec	65	Crops nec	34	Sugar	39
Plant based fibers	1206	Crops nec	156	Plant based fibers	791	Processed rice	62	Sugar	32	Plant based fibers	26
Sugar	805	Forestry	104	Sugar	620	Sugar	25	Processed rice	30	Processed rice	23
Vegetables, fruit, nuts	362	Sugar	88	Vegetables, fruit, nuts	281	Forestry	22	Forestry	19	Metals nec	10
Forestry	352	Textiles	63	Cereal grains nec	253	Textiles	19	Cereal grains nec	10	Vegetables, fruit, nuts	8.1
Cereal grains nec	326	Cereal grains nec	52	Vegetable oils and fats	239	Sugar cane, sugar beet	18	Oil seeds	9.7	Minerals nec	7.2
Vegetable oils and fats	302	Oil seeds	50	Forestry	200	Animal products nec	17	Metals nec	8.5	Textiles	6.8
Oil seeds	265	Vegetables, fruit, nuts	49	Oil seeds	189	Vegetables, fruit, nuts	17	Vegetables, fruit, nuts	8.1	Forestry	6.7
% of Total mrh-eqv for top 10 sectors	72%		72%		72%		77%		75%		77%
B		**INTRA-TERRITORIAL IMPORTS**									
Single Score		**Labor Rights & Decent Work**		**Health & Safety**		**Human Rights**		**Governance**		**Community Infrastructure**	
Forestry	59	Processed rice	7.5	Forestry	53	Processed rice	3.0	Processed rice	1.0	Metals nec	1.1
Vegetables, fruit, nuts	45	Forestry	3.9	Vegetables, fruit, nuts	40	Textiles	0.9	Metals nec	1.0	Processed rice	0.8
Processed rice	40	Vegetables, fruit, nuts	3.5	Oil seeds	35	Crops nec	0.9	Petroleum, coal products	0.8	Crops nec	0.5
Oil seeds	39	Petroleum, coal products	3.3	Paddy rice	32	Vegetables, fruit, nuts	0.8	Forestry	0.8	Forestry	0.5
Paddy rice	35	Textiles	3.3	Wheat	30	Wearing apparel	0.8	Textiles	0.4	Vegetables, fruit, nuts	0.4
Crops nec	34	Crops nec	3.1	Crops nec	29	Petroleum, coal products	0.8	Vegetables, fruit, nuts	0.4	Petroleum, coal products	0.4
Wheat	32	Wearing apparel	3.0	Cereal grains nec	29	Forestry	0.7	Oil seeds	0.4	Textiles	0.4
Cereal grains nec	32	Oil seeds	2.7	Processed rice	28	Vegetable oils and fats	0.7	Crops nec	0.4	Wearing apparel	0.4
Wood products	30	Plant based fibers	2.6	Wood products	27	Metals nec	0.7	Cereal grains nec	0.4	Beverages and tobacco products	0.3
Wearing apparel	30	Metals nec	2.6	Sugar cane, sugar beet	26	Beverages and tobacco products	0.6	Wearing apparel	0.4	Metal products	0.3
% of Total mrh-eqv for top 10 sectors	42%		44%		42%		50%		44%		47%

3.2.2 Damage Assessment of Social Risks – Contributions of Social Themes in Each Thematic Area

An examination of the contributions of individual social themes to the life cycle-based social risk scores in each thematic area is similarly useful in that it provides insight into the relative importance of specific social themes to estimated social risk within and across sectors. It also illustrates the different patterns observable between intra- and extra-territorial imports. Tables 9 and 10 report the top three sectors (% contribution to total risk) for each social theme by thematic area for total intra- and extra-territorial imports to EU-27 Member States in 2010. Tables 11 and 12 report the medium risk hour equivalents for the top three sectors by social theme for each of the five thematic areas for intra- and extra-territorial imports, respectively, per euro spent on imports in each sector. Figures 17A-B – 21A-B depict the % contributions by social theme to overall social risk scores in each thematic area per euro spent in each sector for imports from all sectors to EU-27 Member States from intra- and extra-territorial trading partners in 2010.

For total intra-territorial imports, the Chemicals, Rubber, Plastics Products sector is the top contributing sector for social risks in 14 of 17 social themes. In the remaining three it is second only to the Metals nec sector (for risks related to Drinking Water and Improved Sanitation) and to the Petroleum, Coal Products sector (for risks related to Forced Labour). The Machinery and Equipment sector is also commonly recurring among the top three sectors for social risk (in 15 of the 17 social themes considered). The top three sectors account for 33-77% of total risk across social themes.

For extra-territorial imports, the Oil sector is the top contributing sector for social risks in 10 of 17 social themes. In 4 social themes, it does not figure among the top 3 sectors. This is notable given the large share of single score social risks attributable to the Oil sector for total extra-territorial imports, and reflects the large share of Injuries and Fatalities risks (24% - the single largest share of risk for a single sector across sectors and social themes) and the high weighting factor for Injuries and Fatalities in determining single score social risk. Other commonly recurring sectors among the top three sectors include Crops nec (11 times), Metals nec (7 times), Textiles (7 times), and Electronic Equipment (5 times). The top three sectors account for 31-60% of total risk across social themes.

Per euro spent in each sector, the Processed Rice sector figures as the top contributing sector for 12 of the 17 social themes considered. This sector is particularly important in terms of Labour Rights and Decent Work, Health and Safety, and Human Rights considerations, but less so for Governance and Community Infrastructure (here, the Metals sector is a more prominent contributor). In general, there is considerable heterogeneity in the scope and ranking of contributing sectors for social risk.

For extra-territorial imports, the range and ranking of sectors with the highest social risk scores in each social theme per euro spent in each sector is much more homogeneous. The Paddy Rice sector is the top contributor in 15 of 17 social themes, followed by the Plant Based Fibres sector for nine of these. Bio-based sectors (i.e. agricultural, forestry, or sectors producing products derived thereof) are consistently highest risk per euro spent across sectors. In general, social risks for each social theme in the top three sectors are 1-2 orders of magnitude higher for extra-territorial compared to intra-territorial imports.

3.2.2.1 Labour Rights and Decent Work Risks per Euro Spent in Each Sector

The Collective Bargaining etc. is the largest contributor to social risk per euro spent for the Labour Rights and Decent Work thematic area when averaged across sectors for both intra- (31.1%) and extra-territorial imports (28.4%). For intra-territorial imports Wage Assessment is, on average, the second largest contributor (15%), with the remaining 5 themes contributing approximately 10% each. For extra-territorial imports, in contrast, Forced Labour is the second largest contributor (20.4%), with the remaining five themes similarly each contributing approximately 10%. Despite being second, on average, Forced Labour in the Paddy Rice sector has the single largest social risk score in Labour Rights and Decent Work for both intra- and extra-territorial imports per euro spent. There are, however, considerable differences between sectors for each social theme. For example, Wage assessment contributes as little as 8.9% to Labour Rights and Decent Work risks for the Transport Equipment sector, compared to 28.8% for the Bovine Cattle, Sheep and Goats, Horses sector for intra-territorial imports. For extra-territorial imports, the contribution of Forced Labour to Labour Rights and Decent Work risks per euro spent in each sector are highest for the Gas (35.6%) and Electricity (28.8%) sectors, and lowest for the Vegetable Oils and Fats sector (12.5%), despite showing the highest absolute score in the Paddy Rice sector.

3.2.2.2 Health and Safety Risks per Euro Spent in Each Sector

Social risks in the Health and Safety domain are assessed in terms of two themes only: (1) Toxics and Hazards and (2) Injuries and Fatalities. Of these, Injuries and Fatalities risks receive a higher weighting than do risks of Toxics and Hazards. For this reason, Injuries and Fatalities contribute the majority share of risks for Health and Safety. For intra-territorial imports, Injuries and Fatalities contribute 97.5% of risk compared to 94.1% for extra-territorial imports. Highest risk sectors for intra-territorial imports are Forestry for Injuries and Fatalities, and Processed Rice for Toxics and Hazards. For extra-territorial imports, highest risk sectors for these social themes are Processed Rice and Paddy Rice respectively.

3.2.2.3 Human Rights Risks per Euro Spent in Each Sector

Social risks per euro spent for Human Rights are quite evenly distributed between the three social themes considered (Indigenous Rights, Gender Equity and High Conflict) in each of the top three sectors, although slightly higher for High Conflict, for both intra- and extra-territorial imports. Processed Rice is the highest risk sector for all three themes for intra-territorial imports, and Paddy Rice for extra-territorial imports.

3.2.2.4 Governance Risks per Euro Spent in Each Sector

Similar to Human Rights, estimated social risks per euro spent are quite evenly distributed between the two contributing social themes (Legal System and Corruption) for intra-territorial imports, but much less so for extra-territorial imports. In the case of the latter, risks of Corruption are notably higher. For intra-territorial imports, social risks related to the Legal System and Corruption are the highest for the Metals and Processed Rice sectors, respectively. Paddy Rice is the highest-risk sector for both measures for extra-territorial imports.

3.2.2.5 Community Infrastructure Risks per Euro Spent in Each Sector

Risks related to Improved Sanitation are highest among the three social themes considered for intra-territorial imports, but the differences in scores among these themes are small in each of the three top-scoring sectors. Differences are slightly more pronounced for extra-territorial imports. Risks related to inadequate access to Hospital Beds are the highest in the Paddy Rice sector (the riskiest sector), but second to Improved Sanitation risks for the second ranking sector (Crops nec) for extra-territorial imports.

Table 9. Top three sectors for social risk by thematic area and social theme (including % contribution) for intra-territorial imports to EU-27 Member States in 2010.

INTRA-TERRITORIAL IMPORTS						
Labour Rights and Decent Work	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Child Labor	Chemical, rubber, plastic products	14	Machinery and equipment nec	10	Metals nec	9
Forced Labor	Petroleum, coal products	15	Chemical, rubber, plastic products	15	Machinery and equipment nec	10
Excessive Working Time	Chemical, rubber, plastic products	15	Machinery and equipment nec	15	Motor vehicles and parts	9
Wage Assessment	Chemical, rubber, plastic products	13	Petroleum, coal products	13	Metals nec	9
Poverty	Chemical, rubber, plastic products	15	Metals nec	11	Machinery and equipment nec	10
Migrant Labor	Chemical, rubber, plastic products	15	Machinery and equipment nec	12	Petroleum, coal products	7
Collective Bargaining etc	Chemical, rubber, plastic products	15	Machinery and equipment nec	13	Petroleum, coal products	11
Health and Safety	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Injuries & Fatalities	Chemical, rubber, plastic products	15	Machinery and equipment nec	13	Petroleum, coal products	11
Toxics & Hazards	Chemical, rubber, plastic products	15	Machinery and equipment nec	15	Electronic equipment	8
Human Rights	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Indigenous Rights	Chemical, rubber, plastic products	13	Textiles	13	Food products nec	13
Gender Equity	Chemical, rubber, plastic products	15	Machinery and equipment nec	11	Petroleum, coal products	9
High Conflict	Chemical, rubber, plastic products	15	Machinery and equipment nec	12	Petroleum, coal products	11
Governance	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Legal System	Chemical, rubber, plastic products	14	Metals nec	13	Machinery and equipment nec	12
Corruption	Chemical, rubber, plastic products	14	Petroleum, coal products	13	Machinery and equipment nec	11
Community Infrastructure	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Drinking Water	Metals nec	22	Chemical, rubber, plastic products	14	Machinery and equipment nec	11
Improved Sanitation	Metals nec	13	Chemical, rubber, plastic products	15	Machinery and equipment nec	12
Hospital Beds	Chemical, rubber, plastic products	15	Machinery and equipment nec	12	Metals nec	11

Table 10. Top three sectors for social risk by thematic area and social theme (including % contribution) for extra-territorial imports to EU-27 Member States in 2010.

EXTRA-TERRITORIAL IMPORTS						
Labour Rights and Decent Work	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Child Labor	Oil	12	Crops nec	11	Textiles	10
Forced Labor	Oil	17	Textiles	9	Electronic equipment	9
Excessive Working Time	Machinery and equipment nec	12	Electronic equipment	11	Textiles	10
Wage Assessment	Oil	16	Crops nec	10	Metals nec	9
Poverty	Oil	14	Crops nec	11	Textiles	11
Migrant Labor	Textiles	12	Machinery and equipment nec	11	Electronic equipment	9
Collective Bargaining etc	Oil	16	Machinery and equipment nec	11	Electronic equipment	9
Health and Safety	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Injuries & Fatalities	Oil	24	Crops nec	11	Metals nec	7
Toxics & Hazards	Machinery and equipment nec	12	Electronic equipment	12	Textiles	10
Human Rights	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Indigenous Rights	Crops nec	19	Textiles	12	Wearing apparel	6
Gender Equity	Oil	12	Textiles	10	Crops nec	9
High Conflict	Oil	13	Machinery and equipment nec	9	Textiles	9
Governance	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Legal System	Oil	17	Metals nec	14	Crops nec	10
Corruption	Oil	20	Metals nec	13	Crops nec	9
Community Infrastructure	**Sector 1**	**%**	**Sector 2**	**%**	**Sector 3**	**%**
Drinking Water	Metals nec	24	Oil	19	Crops nec	17
Improved Sanitation	Metals nec	18	Crops nec	13	Oil	11
Hospital Beds	Crops nec	11	Metals nec	10	Oil	10

Table 11. Medium risk hour-equivalent social risk per social theme in each thematic area for the top three sectors per euro spent in each sector on intra-territorial imports to EU-27 Member States in 2010.

INTRA-TERRITORIAL IMPORTS						
Labour Rights and Decent Work	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Child Labor	Processed rice	1.1	Oil seeds	0.6	Crops nec	0.5
Forced Labor	Processed rice	1.4	Petroleum, coal products	0.7	Vegetables, fruit, nuts	0.6
Excessive Working Time	Processed rice	0.6	Wearing apparel	0.3	Textiles	0.3
Wage Assessment	Processed rice	1.1	Forestry	0.8	Bovine cattle, sheep and goats, horses	0.6
Poverty	Processed rice	1.1	Metals nec	0.5	Textiles	0.4
Migrant Labor	Processed rice	1.0	Vegetables, fruit, nuts	0.6	Textiles	0.4
Collective Bargaining etc	Petroleum, coal products	1.3	Forestry	1.3	Processed rice	1.2
Health and Safety	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Injuries & Fatalities	Forestry	52.1	Vegetables, fruit, nuts	39.1	Oil seeds	34.3
Toxics & Hazards	Processed rice	1.6	Cereal grains nec	0.8	Forestry	0.7
Human Rights	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Indigenous Rights	Processed rice	1.0	Crops nec	0.3	Vegetables, fruit, nuts	0.3
Gender Equity	Processed rice	1.0	Textiles	0.3	Wearing apparel	0.3
High Conflict	Processed rice	1.1	Petroleum, coal products	0.4	Textiles	0.4
Governance	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Legal System	Metals nec	0.9	Processed rice	0.8	Petroleum, coal products	0.6
Corruption	Processed rice	1.2	Metals nec	1.0	Forestry	0.9
Community Infrastructure	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Drinking Water	Metals nec	0.8	Forestry	0.3	Crops nec	0.3
Improved Sanitation	Metals nec	0.9	Processed rice	0.6	Oil seeds	0.4
Hospital Beds	Processed rice	0.7	Metals nec	0.5	Vegetables, fruit, nuts	0.4

Table 12. Medium risk hour-equivalent social risk per social theme in each thematic area for the top three sectors per euro spent in each sector on extra-territorial imports to EU-27 Member States in 2010.

EXTRA-TERRITORIAL IMPORTS						
Labour Rights and Decent Work	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Child Labor	Paddy rice	92.9	Plant based fibers	40.4	Crops nec	32.1
Forced Labor	Paddy rice	175.6	Plant based fibers	78.1	Crops nec	31.4
Excessive Working Time	Paddy rice	49.0	Processed rice	19.2	Plant based fibers	14.4
Wage Assessment	Paddy rice	92.9	Plant based fibers	38.5	Processed rice	32.1
Poverty	Paddy rice	90.8	Plant based fibers	39.2	Processed rice	28.5
Migrant Labor	Paddy rice	87.9	Plant based fibers	24.6	Forestry	11.1
Collective Bargaining etc	Paddy rice	81.6	Plant based fibers	61.7	Forestry	39.0
Health and Safety	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Injuries & Fatalities	Processed rice	1518.2	Paddy rice	1355.3	Crops nec	981.9
Toxics & Hazards	Paddy rice	116.8	Processed rice	43.9	Plant based fibers	29.8
Human Rights	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Indigenous Rights	Paddy rice	78.5	Processed rice	27.0	Crops nec	21.7
Gender Equity	Paddy rice	81.8	Plant based fibers	28.9	Crops nec	19.7
High Conflict	Paddy rice	90.8	Plant based fibers	32.7	Crops nec	23.2
Governance	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Legal System	Paddy rice	28.4	Crops nec	16.5	Sugar	16.0
Corruption	Paddy rice	51.5	Plant based fibers	21.4	Crops nec	17.2
Community Infrastructure	**Sector 1**	**mrh-eq**	**Sector 2**	**mrh-eq**	**Sector 3**	**mrh-eq**
Drinking Water	Crops nec	15.1	Sugar	14.7	Plant based fibers	7.6
Improved Sanitation	Paddy rice	25.6	Crops nec	16.4	Sugar	15.1
Hospital Beds	Paddy rice	28.4	Crops nec	12.0	Processed rice	10.9

Figure 17A-B. Comparing % contributions of social themes to the overall *Labour Rights and Decent Work* social risk score per euro spent in each sector for imports to EU-27 Member States from (A) intra- and (B) extra-territorial trading partners in 2010.

Figure 18A-B. Comparing contributions of contributing social themes to the overall *Health and Safety* social risk score per euro spent in each sector for imports to EU-27 Member States from (A) intra- and (B) extra-territorial trading partners in 2010.

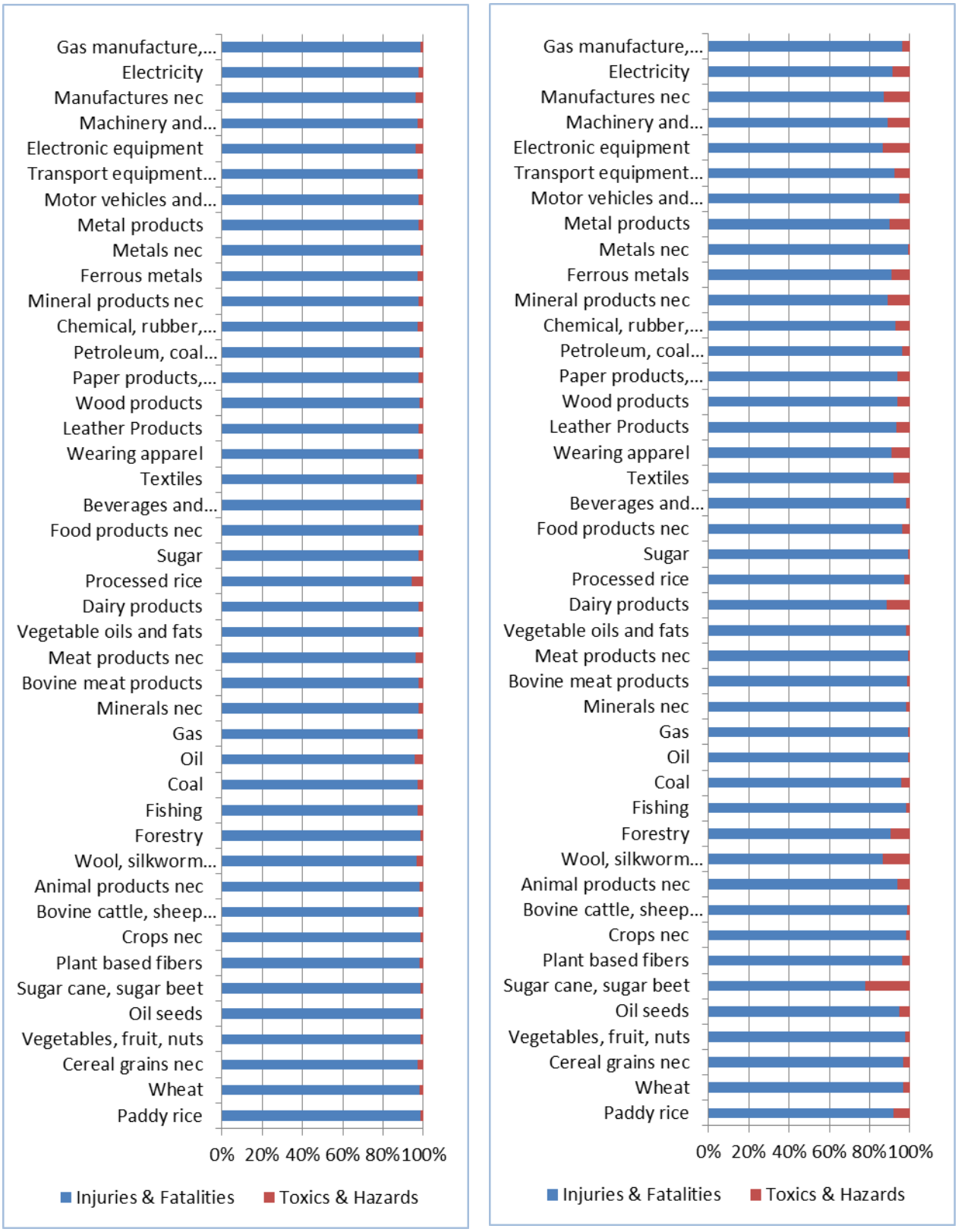


Figure 19A-B. Comparing contributions of contributing social themes to the overall *Human Rights* social risk score per euro spent in each sector for imports to EU-27 Member States from (A) intra- and (B) extra-territorial trading partners in 2010.

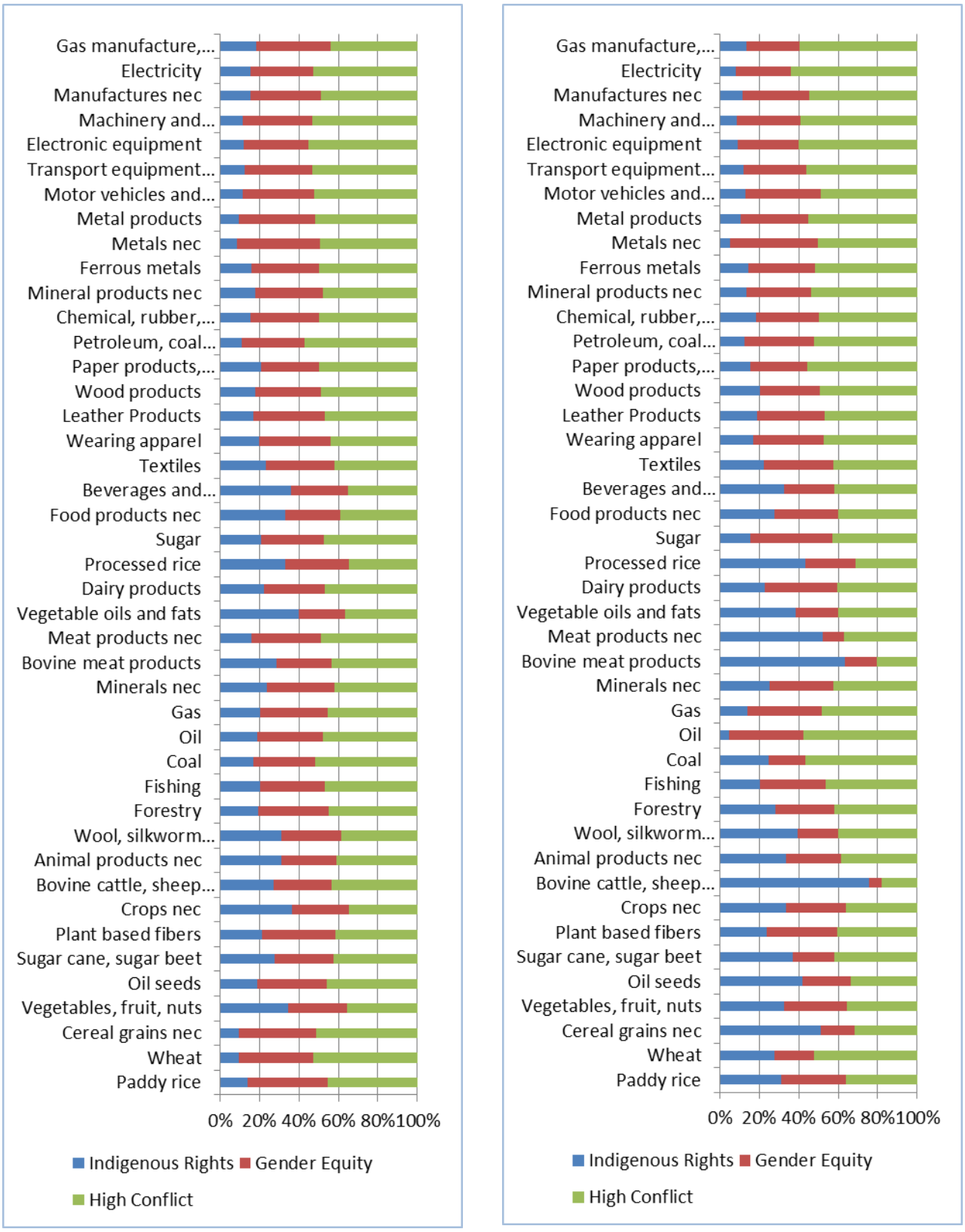


Figure 20A-B. Comparing contributions of contributing social themes to the overall *Governance* social risk score per euro spent in each sector for imports to EU-27 Member States from (A) intra- and (B) extra-territorial trading partners in 2010.

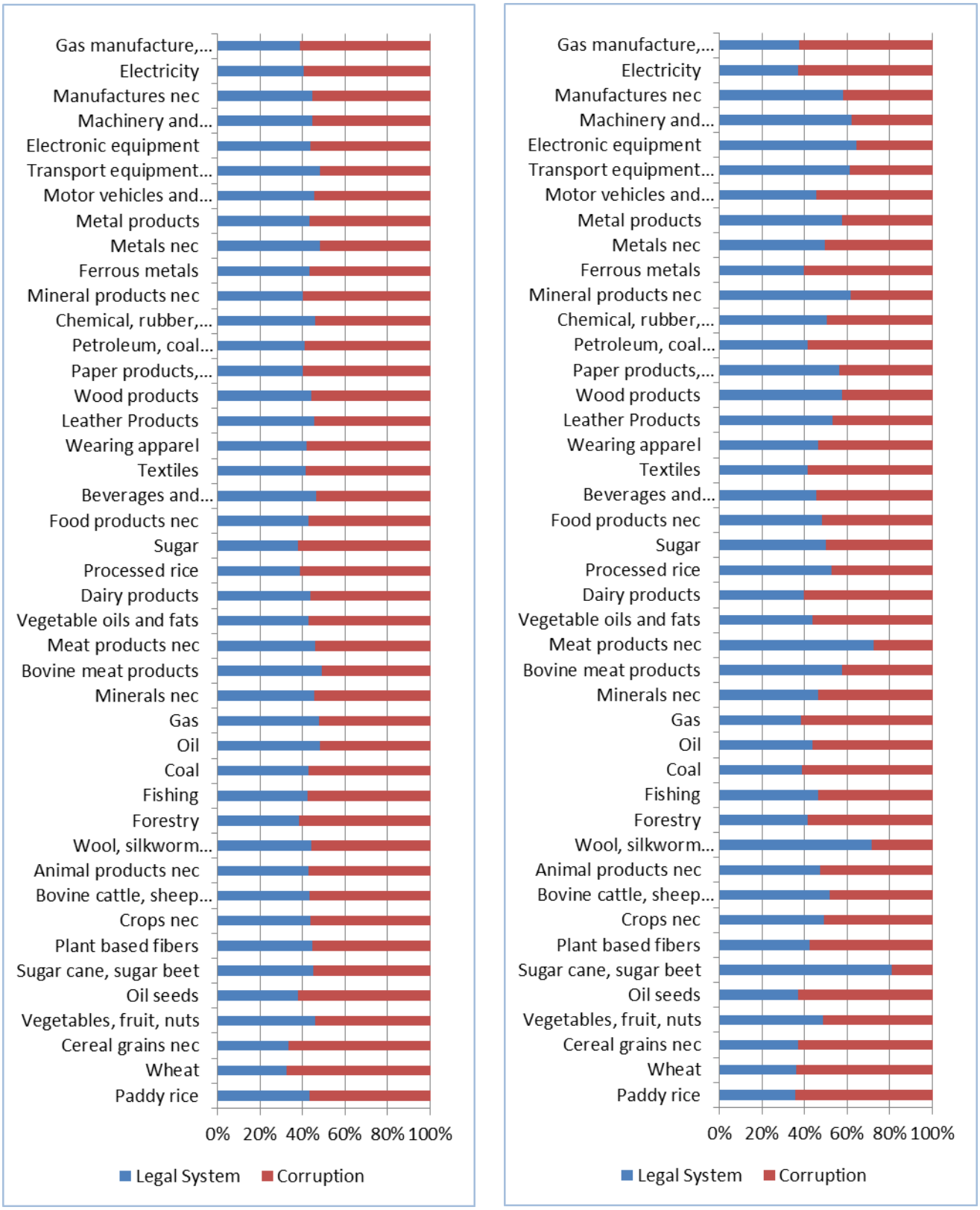
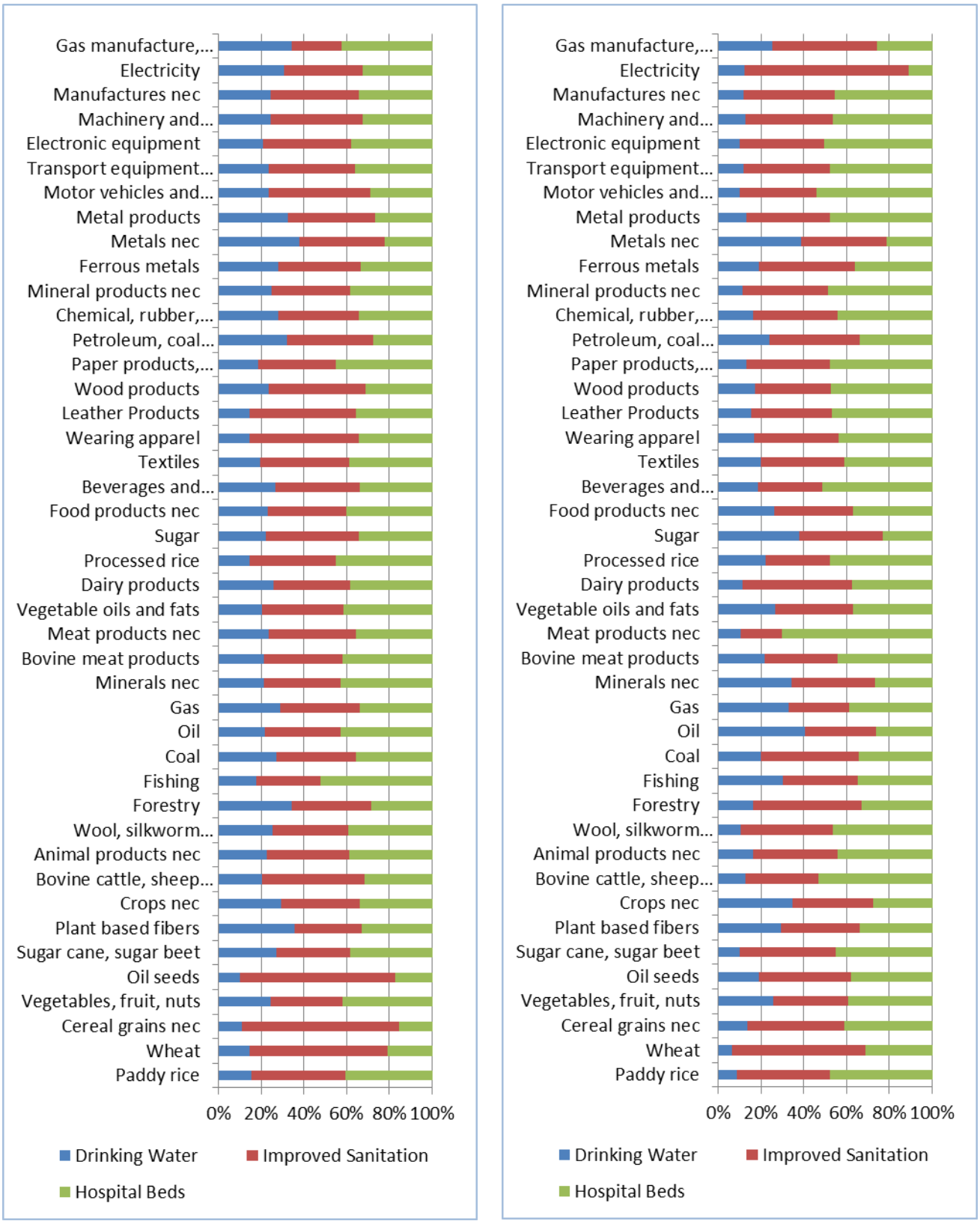


Figure 21A-B. Comparing contributions of contributing social themes to the overall *Community Infrastructure* social risk score per euro spent in each sector for imports to EU-27 Member States from (A) intra- and (B) extra-territorial trading partners in 2010.



3.2 Understanding the Distribution of Social Risk in Supply Chains

In previous sections, we described the distribution of social risk between sectors in terms of a single score measure of risk, by thematic area, and by social theme. We highlighted high risk sectors based on total flows (by value) of imported commodities, as well as per euro spent on imported commodities in each sector. This level of assessment is useful for identifying key risk areas as well as key sectors to consider in the context of efforts to mitigate social risk for supply chain actors through trade, development, and other policy initiatives. Once priority issues and sectors are identified however, the next necessary step is to seek to better understand the geographical distribution of risk, as well as the specific supply chain actors who are most at risk. This requires describing the distribution of risk between countries and supply chain stages. Once again, useful distinctions can be made between the risk associated with total trade flows and risk per euro spent on imported products from each sector, as well as the risk profiles of intra- versus extra-territorial imports. For illustrative purposes, we focus on a small subset of representative examples only – specifically: Oil (the highest risk sector for total trade flows); Paddy Rice (the highest risk sector per euro spent on imports from each sector); and Electronic Goods, which illustrates important differences to consider when assessing social risk for intra- versus extra-territorial imports.

3.2.1 Social Risks by Country and Supply Chain Actors for Total Extra-Territorial Oil Imports

Extra-territorial oil imports account for 13% by value of the total extra-territorial imports considered in this analysis. Across the 43 sectors considered, extra-territorial oil imports also account for 24% of the total risks related to Injuries and Fatalities, 24% for Drinking Water, 20% for Corruption, 19% for Indigenous Rights, 18% for Improved Sanitation, and 17% for risks related to both Forced Labour and the Legal System. Figure 22 presents the single score social risks, including attribution by social theme and trading partner, associated with total imports from the Oil sector into EU-27 Member States from extra-territorial trading partners in 2010. Immediately evident here is the very large share of risk attributable to imports from Angola, and that Health and Safety risks contribute the majority share. This is similarly true when risks associated with Oil sector imports are considered on a per euro basis (Figure 23). However, per euro spent on imports from each sector, the Oil sector ranks 18th of the 43 sectors considered in terms of Health and Safety risks. If supply chain Health and Safety risks are a priority area for leveraging improvements via external policies and the goal is leverage the largest possible improvements rather than focus on the most acute instances of Health and Safety risks, then Oil sector imports from Angola might be considered an appropriate starting point.

A closer examination of the distribution of social risk for Oil sector imports from Angola, however, reveals that targeting the Angolan oil sector specifically also requires considering activities in other sectors that directly support the production of oil in Angola (Figure 24). This includes, among others the Commerce, Transport nec, Communication, and Recreational and Other Services sectors. Here, it appears that 58% of the single score social risk attributable to Oil sector imports from Angola actually occur in the supporting Commerce sector. However, since the share of risk attributed to the Commerce sector remains the same regardless of the thematic area considered, it is clear that sector-level social risk data is currently not available in the SHDB for Angola. Rather, the distribution between sectors simply reflects the distribution of worker hours and wages in these supporting sectors, with country-level risk scores applied across sectors.

Figure 22. Single score social risks (mrh-eq) for total imports of oil into the EU-27 Member States from extra-territorial trading partners in 2010.

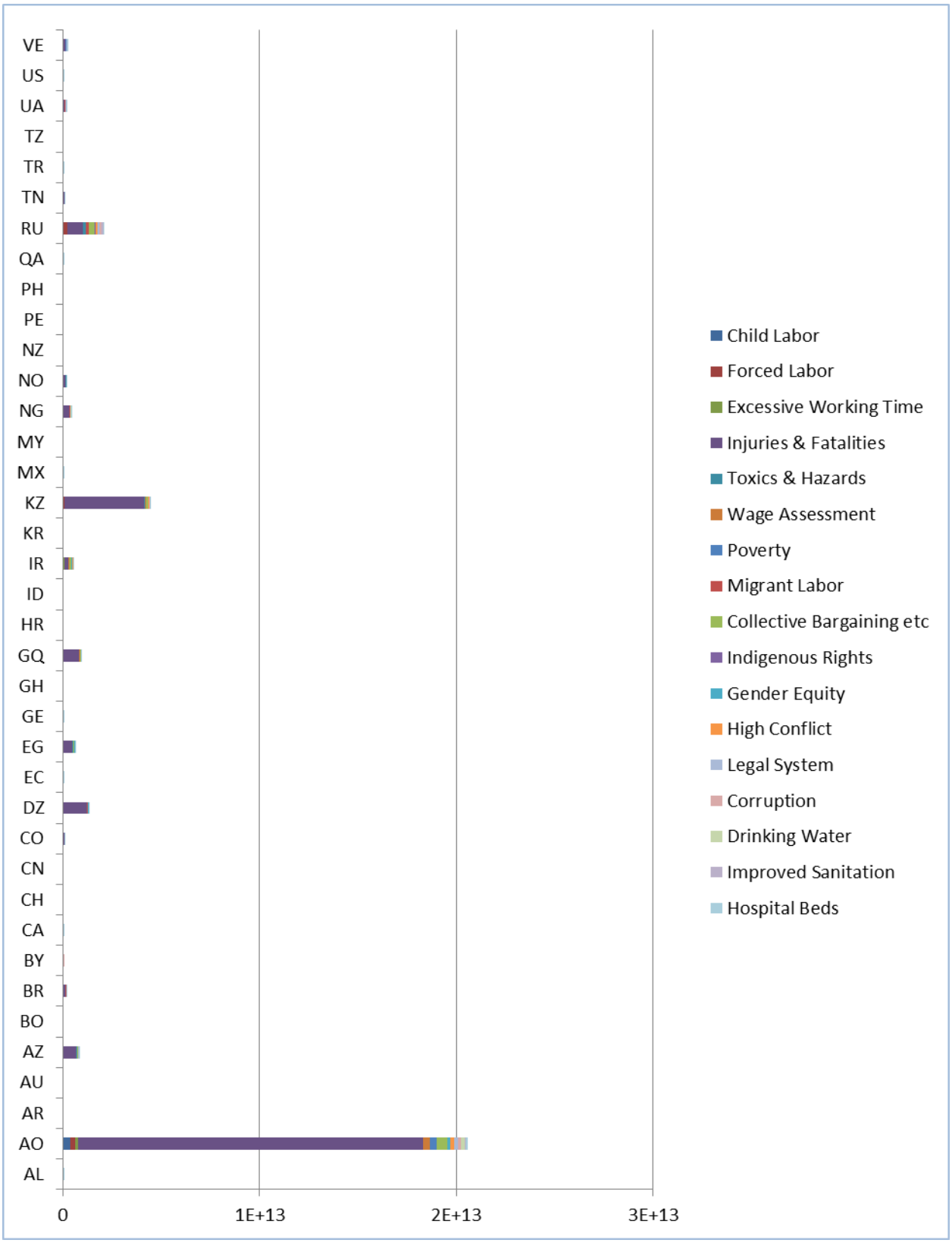


Figure 23. Single score social risks (mrh-eq per euro spent for oil from each trading partner) for imports of oil into the EU-27 Member States from extra-territorial trading partners in 2010.

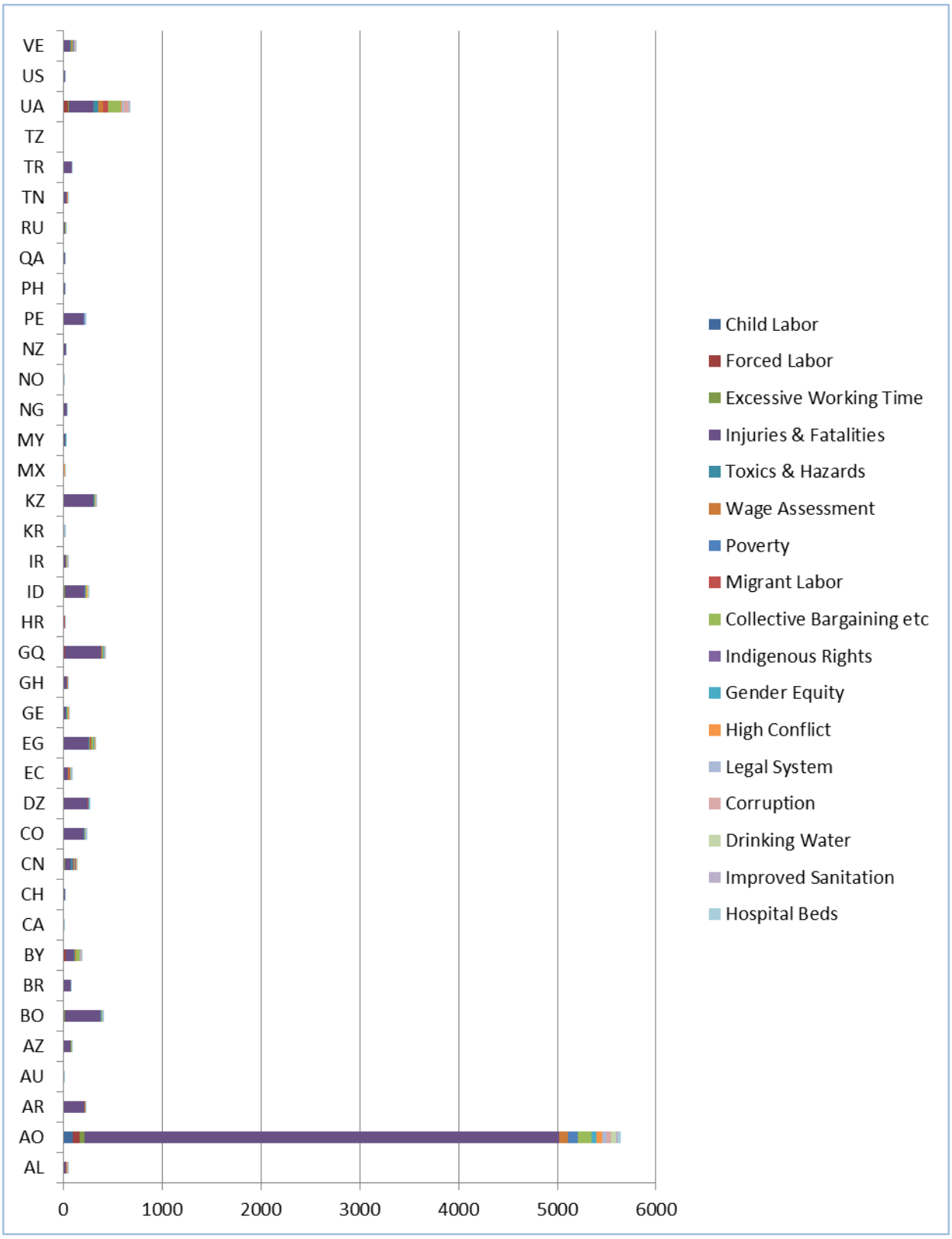
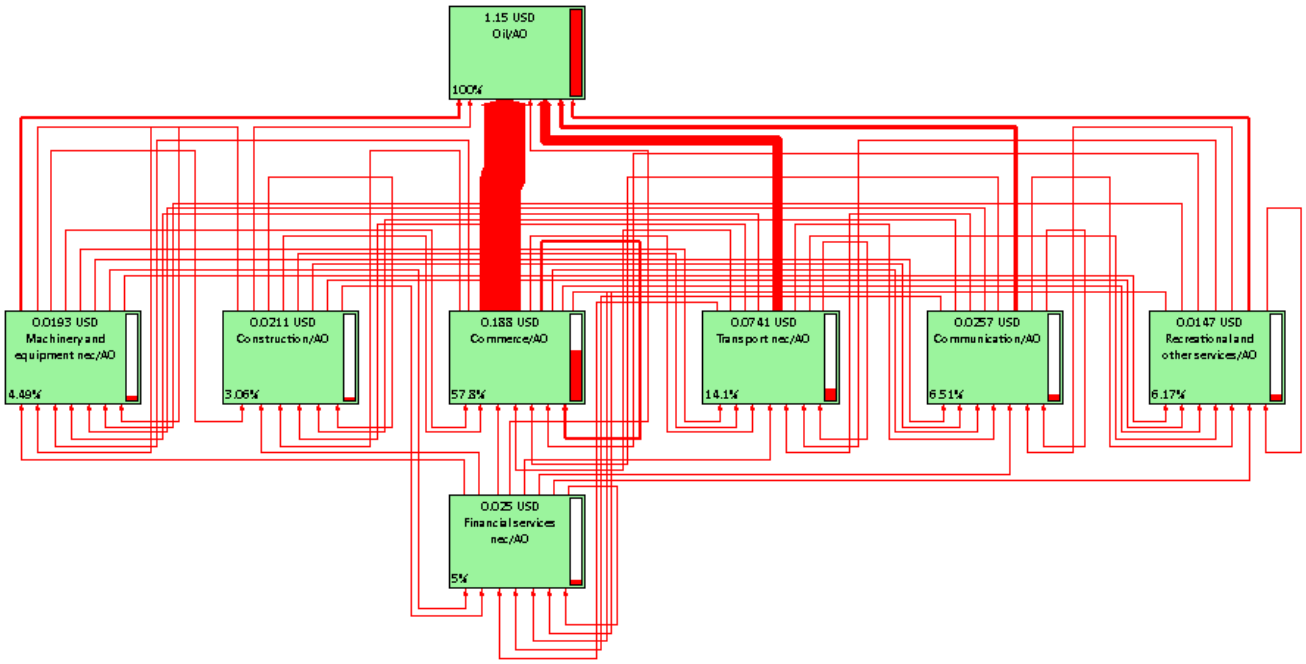


Figure 24. Distribution of single score social risk associated with Oil sector production in Angola (2.5% cut-off applied). Width of arrows reflects relative magnitude of contribution to overall estimated risk.



3.2.2 Social Risks by Country and Supply Chain Actors for Extra-territorial Rice Imports

Extra-territorial rice imports do not rank among the top contributing sectors to social risks when considered at the level of total imports. This is due to the relatively small value of extra-territorial rice imports relative to the value of goods imported in other sectors. On a per euro spent basis, however, Paddy Rice is the top contributing sector for 15 of the 17 social themes considered, and ranks among the top three for all social themes other than Drinking Water. If targeting areas of acute social risk is a policy priority, then Paddy Rice imports from extra-territorial trading partners is an obvious focal point. This is similarly true for intra-territorial imports of processed rice, where the majority of supply chain risks are not located in the (EU) countries of processing, but rather upstream in the Paddy Rice sectors of extra-territorial trading partners.

Figure 25 presents the geographical distribution of single score social risks for total imports of Paddy Rice from extra-territorial trading partners, while Figure 26 presents the distribution per euro spent in each sector. Figure 27-36 present the distribution of social risk by country and social theme for total extra-territorial imports as well as per euro spent on imports from each country. For total imports, India is responsible for the largest share of single score social risk, followed by Pakistan and Thailand (Figure 25). Interesting to note here is the much larger proportion of risk attributable to Health and Safety in Pakistan and Thailand compared to India, where the contributions of other social risks themes is large. In light of the high weighting factor applied to Injuries and Fatalities in the Health and Safety thematic area, this suggests one of two things: either better Health and Safety conditions in India compared to the others, or much higher risks in India in other thematic areas.

Considering single score risk per euro spent on Paddy Rice imports from each extra-territorial trading partner, however, presents a very different picture (Figure 26). Here, risks are highest per euro spent on Paddy Rice imports from Cambodia, followed by Laos and Vietnam – again, predominantly influenced by Health and Safety risks. Per euro spent, India ranks 8th among 40 trading partners.

Considering risk scores per social theme provides a more nuanced picture. For Labour Rights and Decent work, for example, India remains the highest risk country on the basis of total imports, but is the third highest risk country (after Cambodia and Laos) per euro spent (Figures 27-28). For Health and Safety, Pakistan is the highest risk country on the basis of total imports, followed by India. In Pakistan, risk is almost totally attributable to Injuries and Fatalities, whereas Toxicity and Hazards risks are proportionately much more important for India. Neither of these countries ranks among the top three for Health and Safety risks per euro spent in each country (Figures 29 and 30). Clearly, priority foci for mitigation of social risk will change depending on whether risk is assessed in terms of total trade flows or per euro spent on imports from each trading partner, as well as on the specific thematic area or social theme considered.

Within specific countries, it is also important to consider the distribution of social risk between supply chain actors. In contrast to the previous example of the Angolan Oil sector, where the majority of social risk was attributable to upstream supply chain actors rather than at the level of oil production itself, the majority of single score social risk in the Indian Paddy Rice sector occurs during Paddy Rice production (Figure 31). Here the second largest contributor is upstream activities in the Indian Bovine Cattle, Sheep and Goats sector, which contributes 9% of the social risk of Paddy Rice production. Other contributing sectors include the Indian Vegetable, Fruit, Nuts sector (4%), and the Electricity and Transport nec sectors (1% respectively). A different pattern is observed when considered Paddy Rice imports from Cambodia. Here, upstream supply chain stages make a much smaller contribution to single score social risk (the largest upstream contributor is the Commerce sector, at 1.5%) than is the case for India (Figure 32). Clearly, policy strategies to mitigate social risk must be attentive to context-specific differences in the supply chain distribution and magnitude of social risks at both the country and sector level.

Figure 25. Single score social risks (mrh-eq) for total imports of paddy rice into the EU-27 Member States from extra-territorial trading partners in 2010.

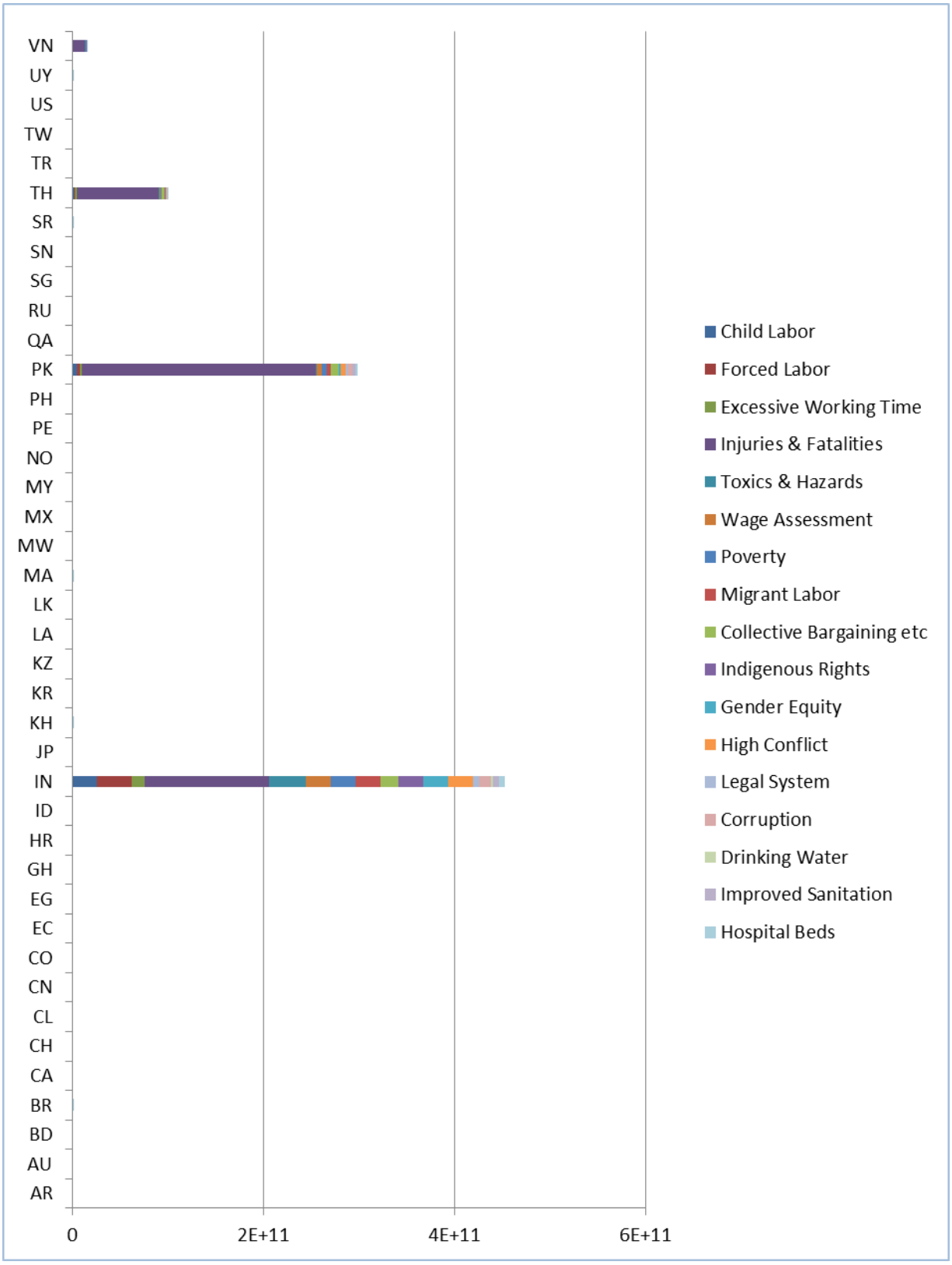


Figure 26. Single score social risks (mrh-eq per euro spent for rice from each trading partner) for imports of paddy rice into the EU-27 Member States from extra-territorial trading partners in 2010.

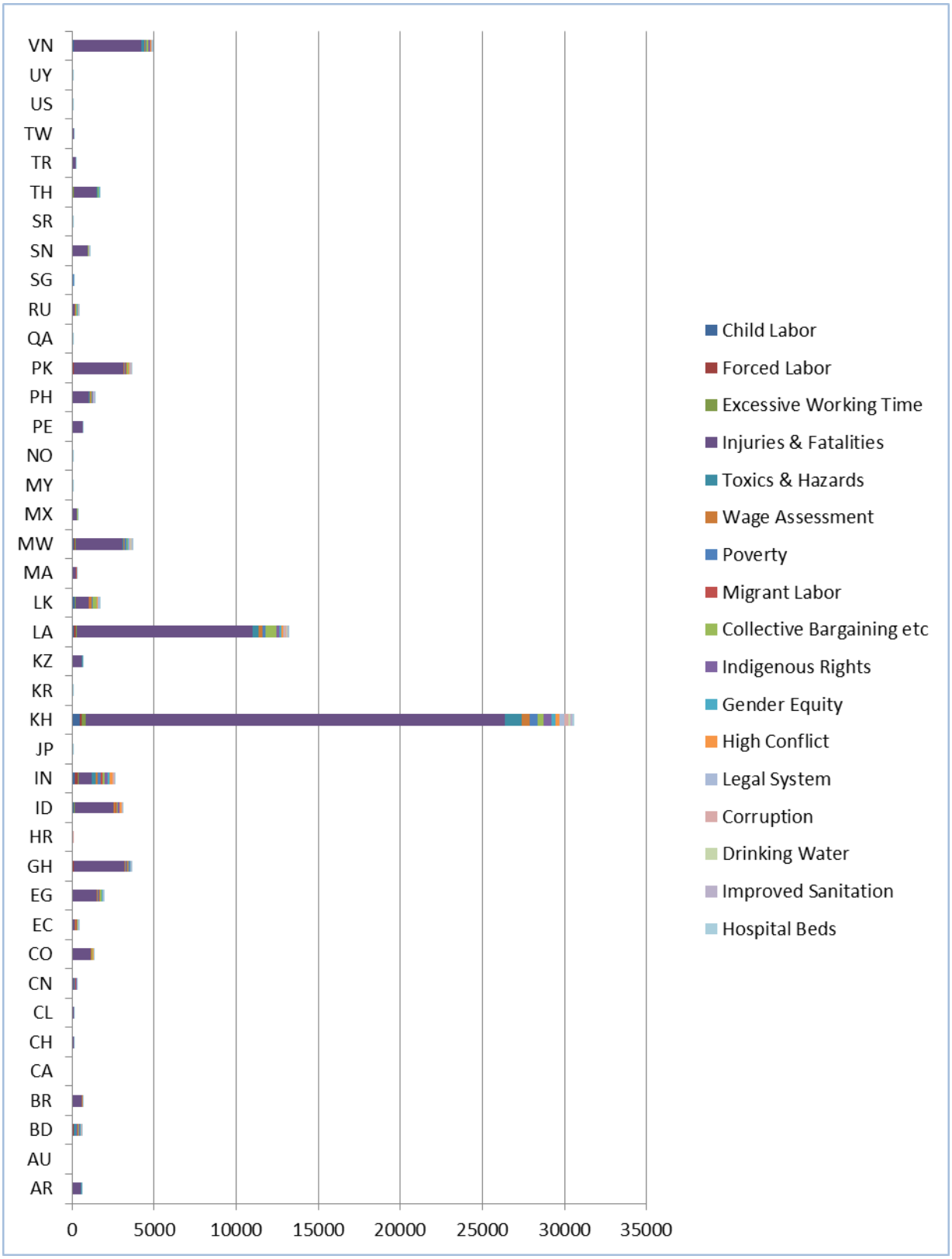


Figure 27. Comparing the overall sector-level *Labour rights and Decent Work* performance (mrh-eq for total euros spent) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

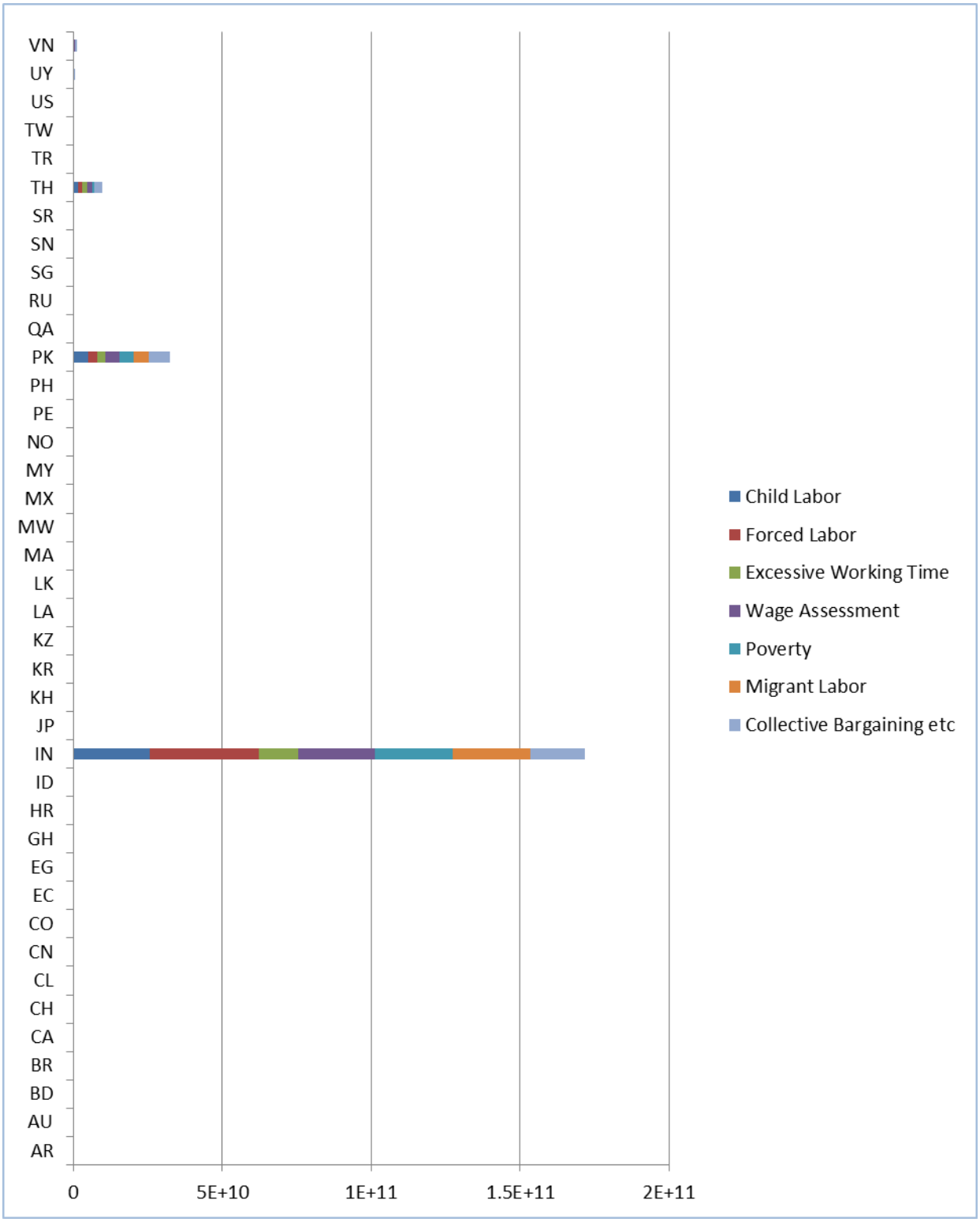


Figure 28. Comparing the sector-level *Labour rights and Decent Work* performance (mrh-eq per euro spent in each country) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

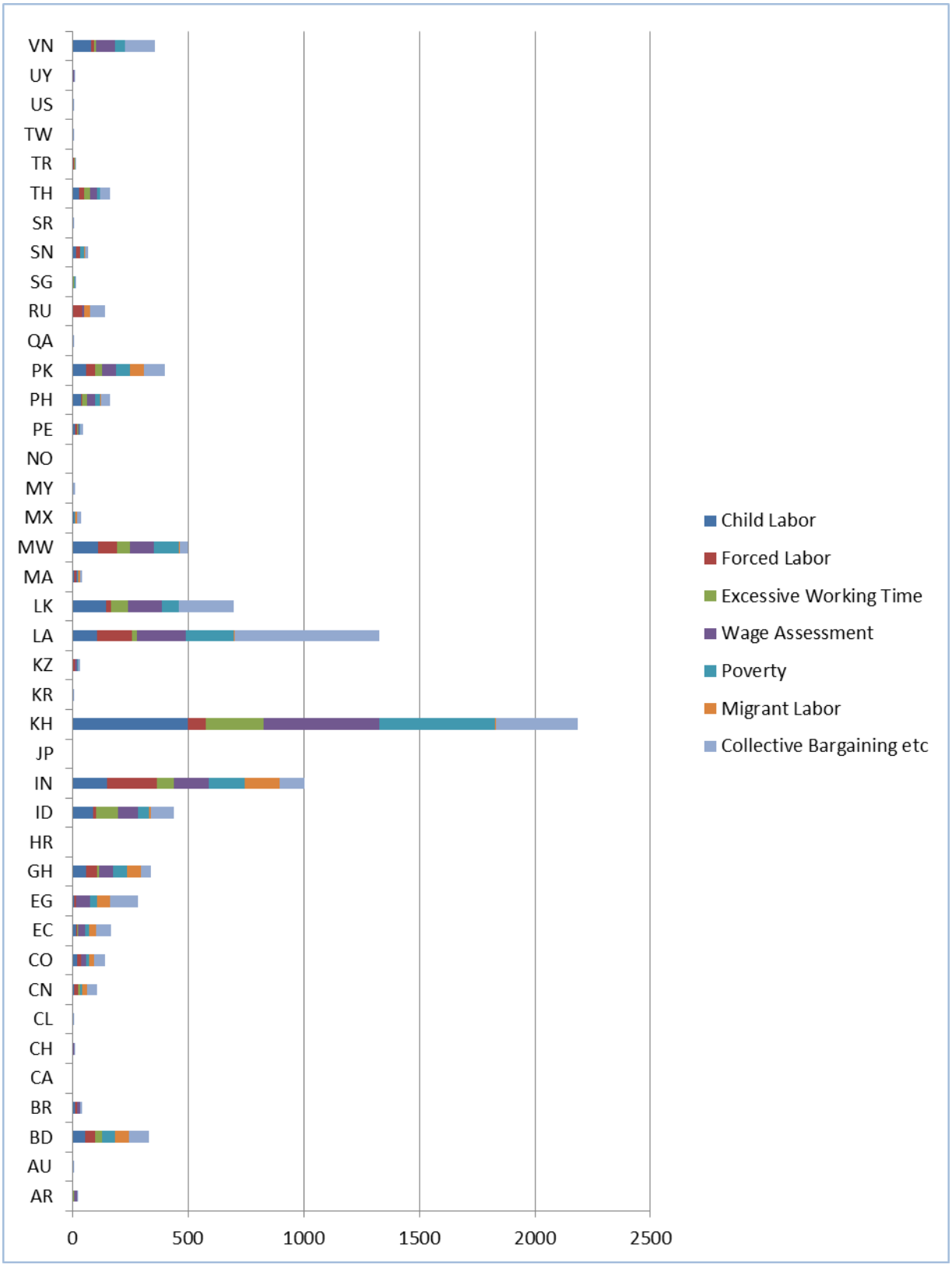


Figure 29. Comparing the overall sector-level *Health and Safety* performance (mrh-eq for total euros spent) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

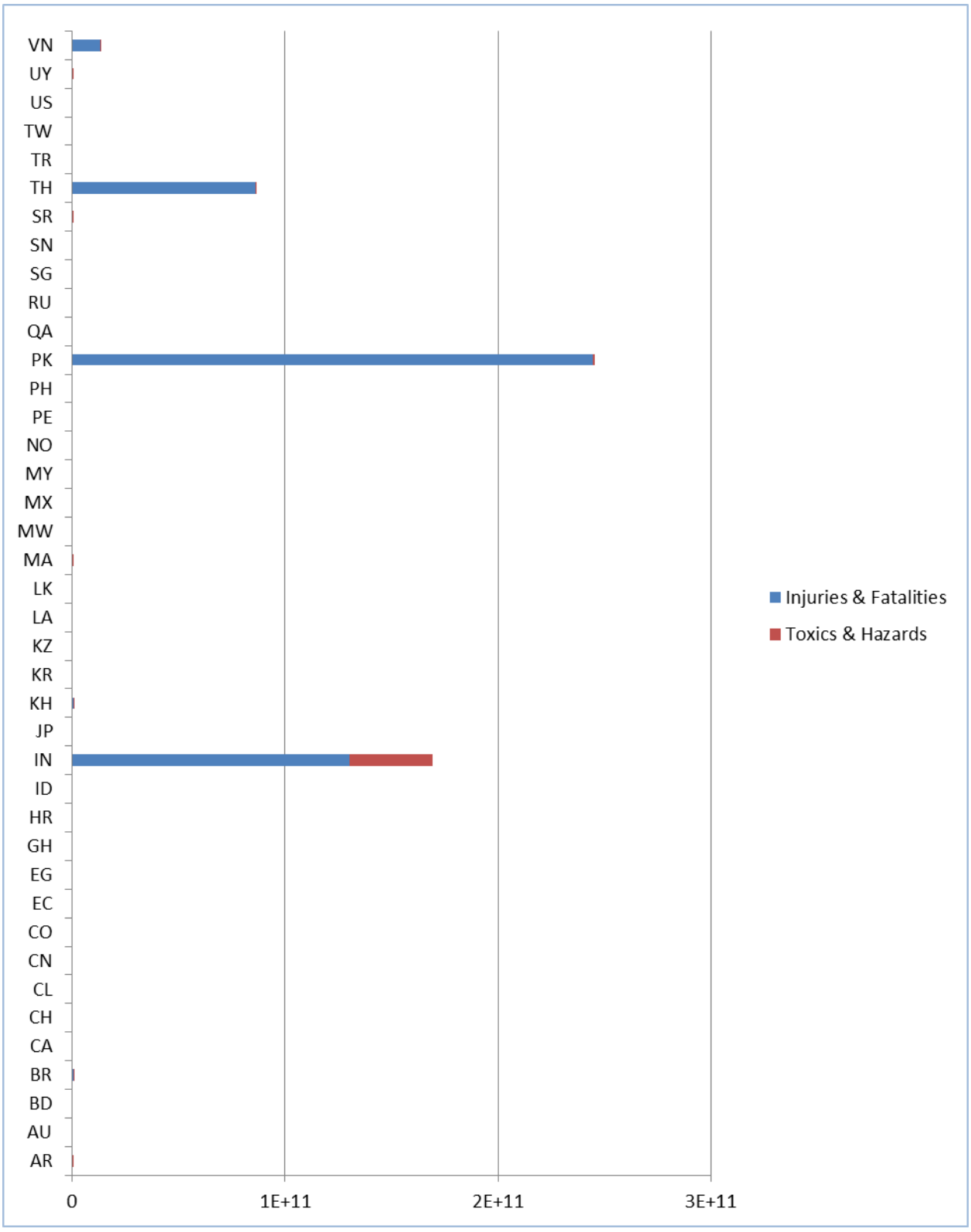


Figure 30. Comparing the sector-level *Health and Safety* performance (mrh-eq per euro spent for each country) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

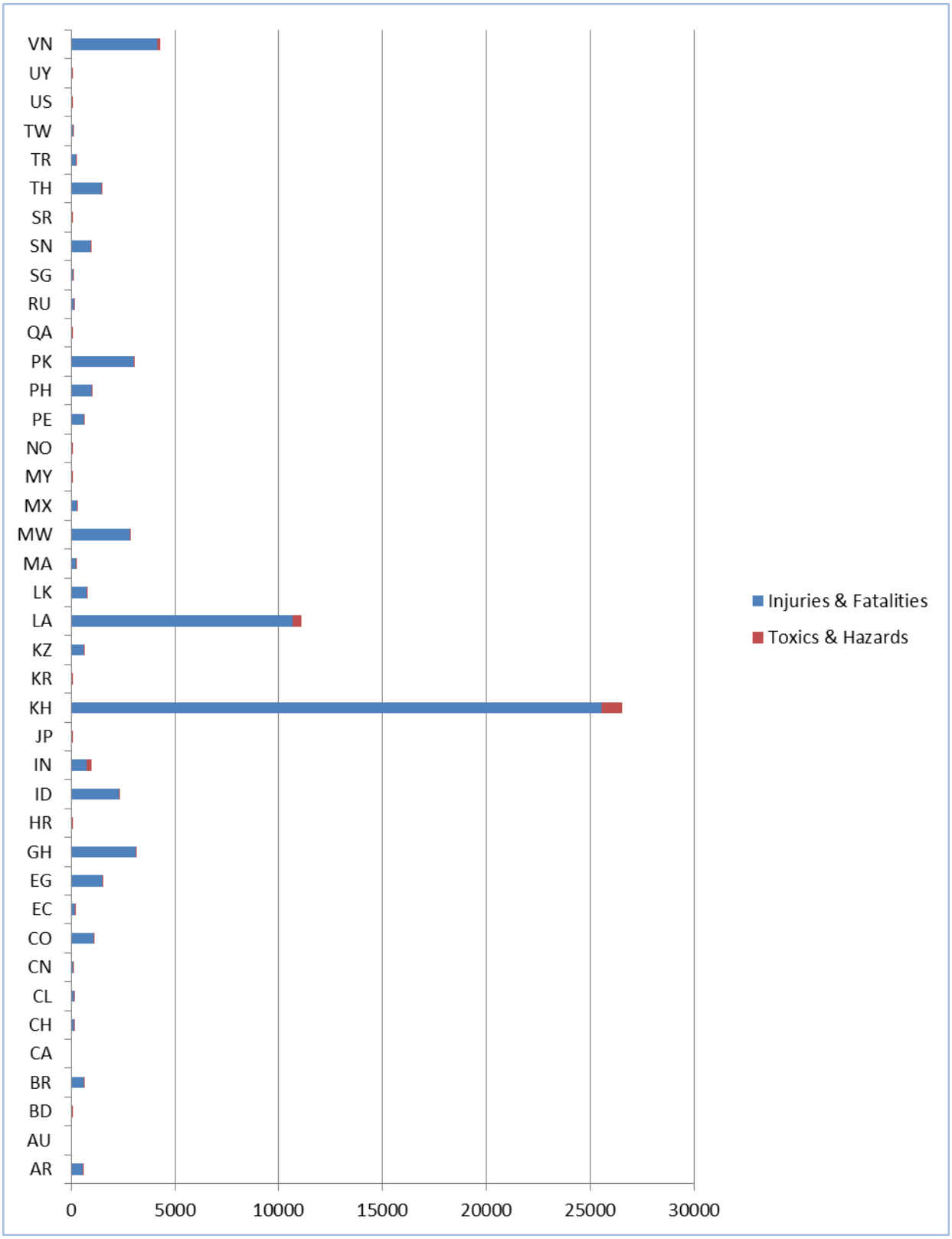


Figure 31. Comparing the overall sector-level *Human Rights* performance (mrh-eq for total euros spent) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

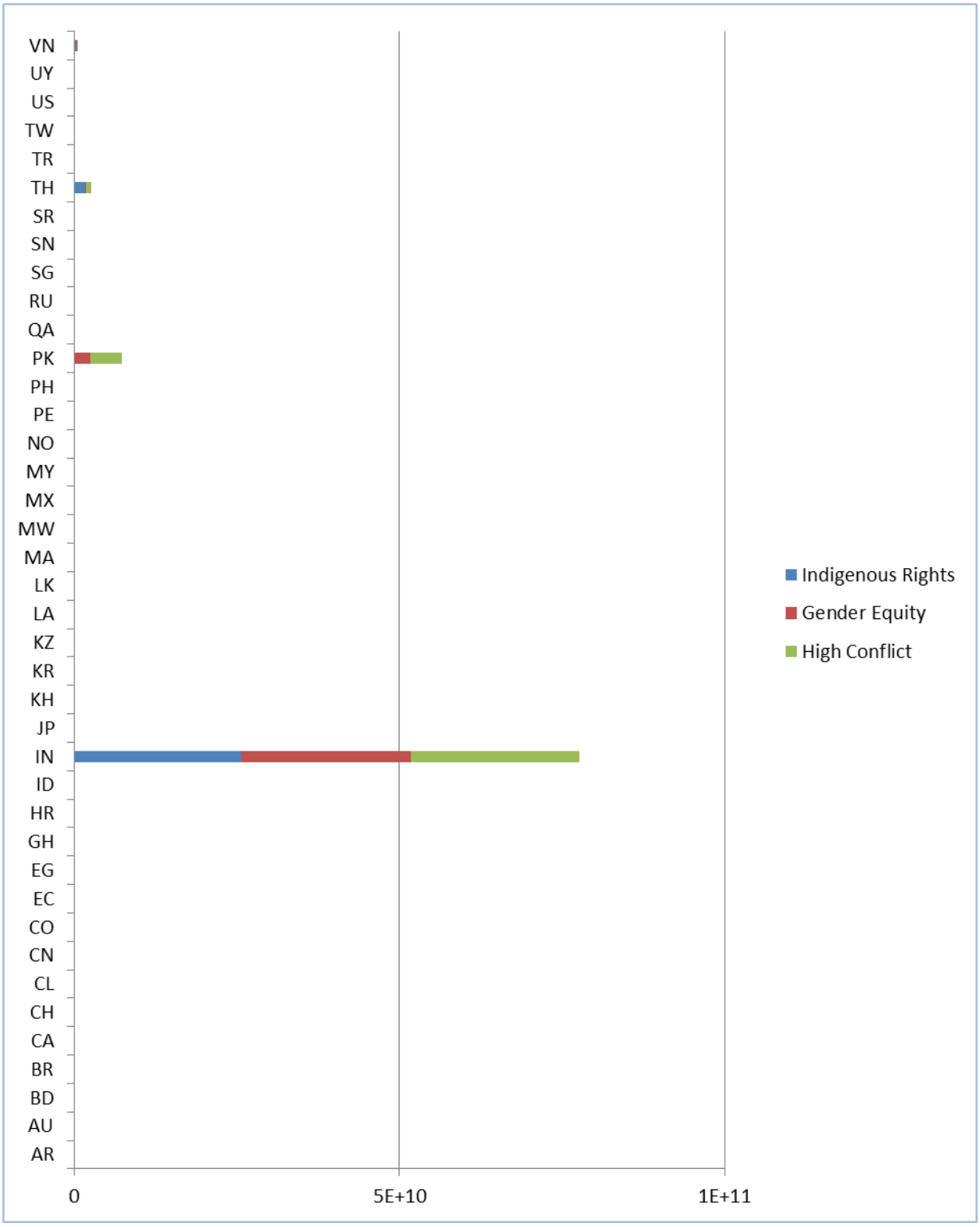


Figure 32. Comparing the sector-level *Human Rights* performance (mrh-eq per euro spent in each country) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

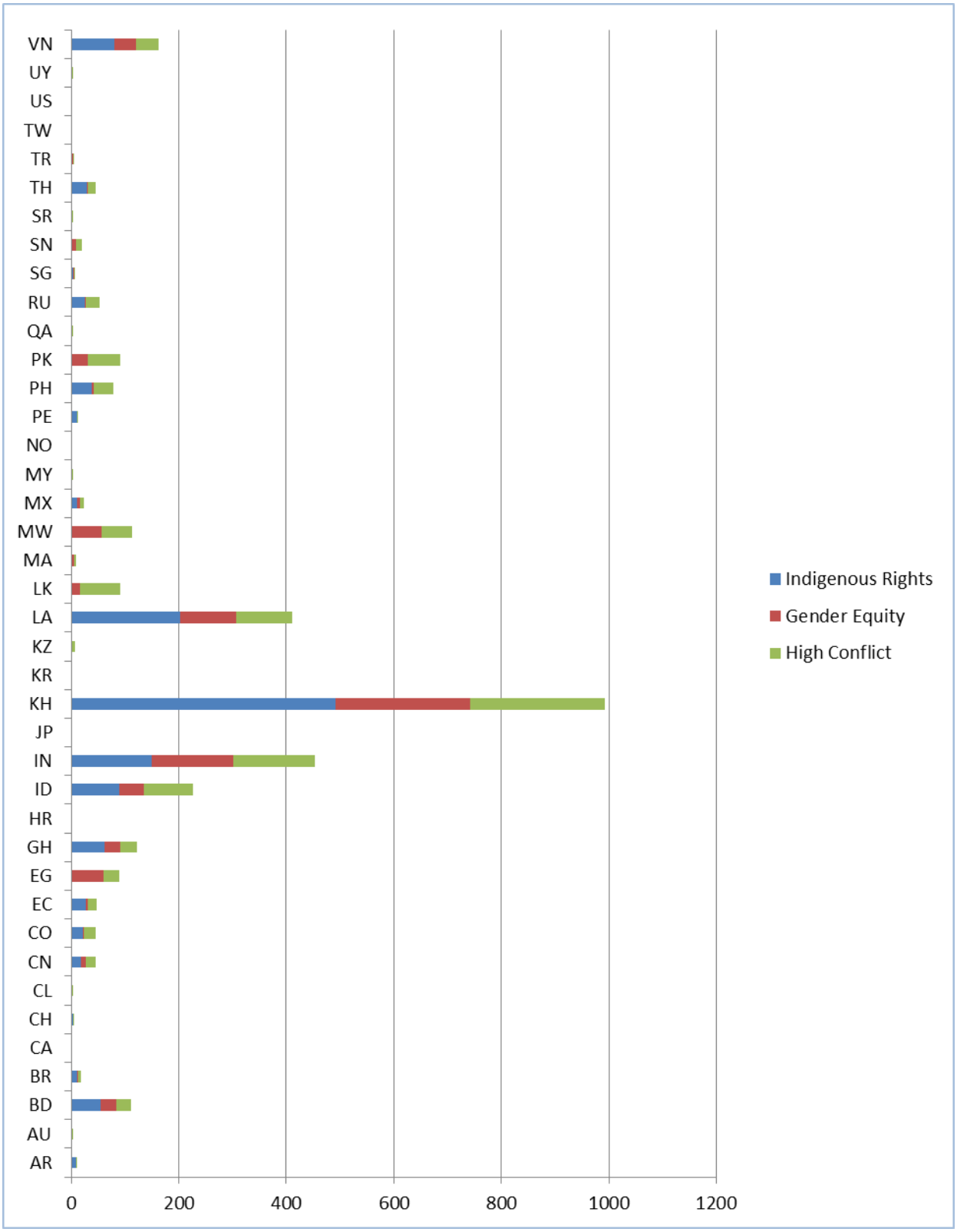


Figure 33. Comparing the overall sector-level *Governance* (mrh-eq for total euros spent) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

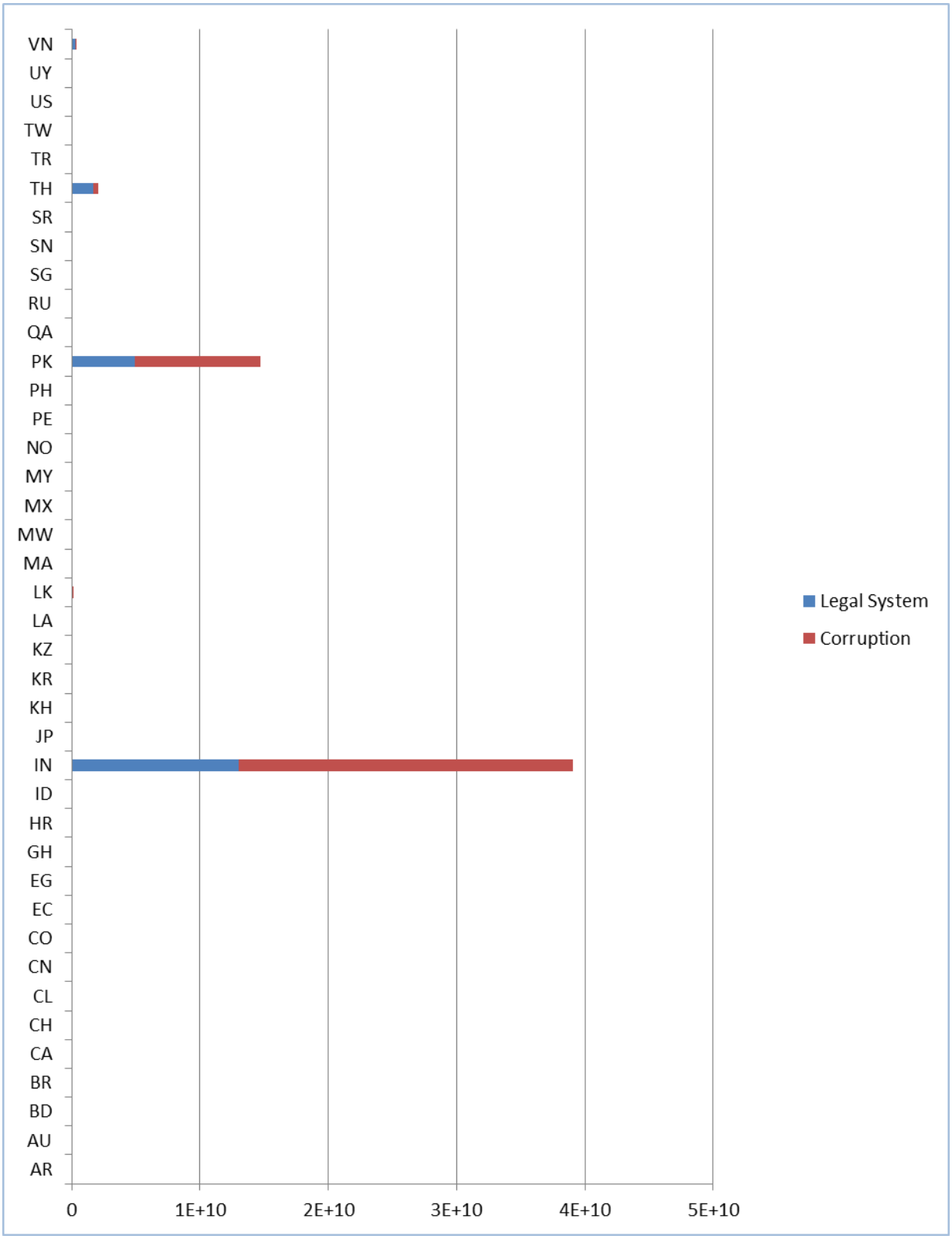


Figure 34. Comparing the sector-level *Governance* performance (mrh-eq per euro spent in each country) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

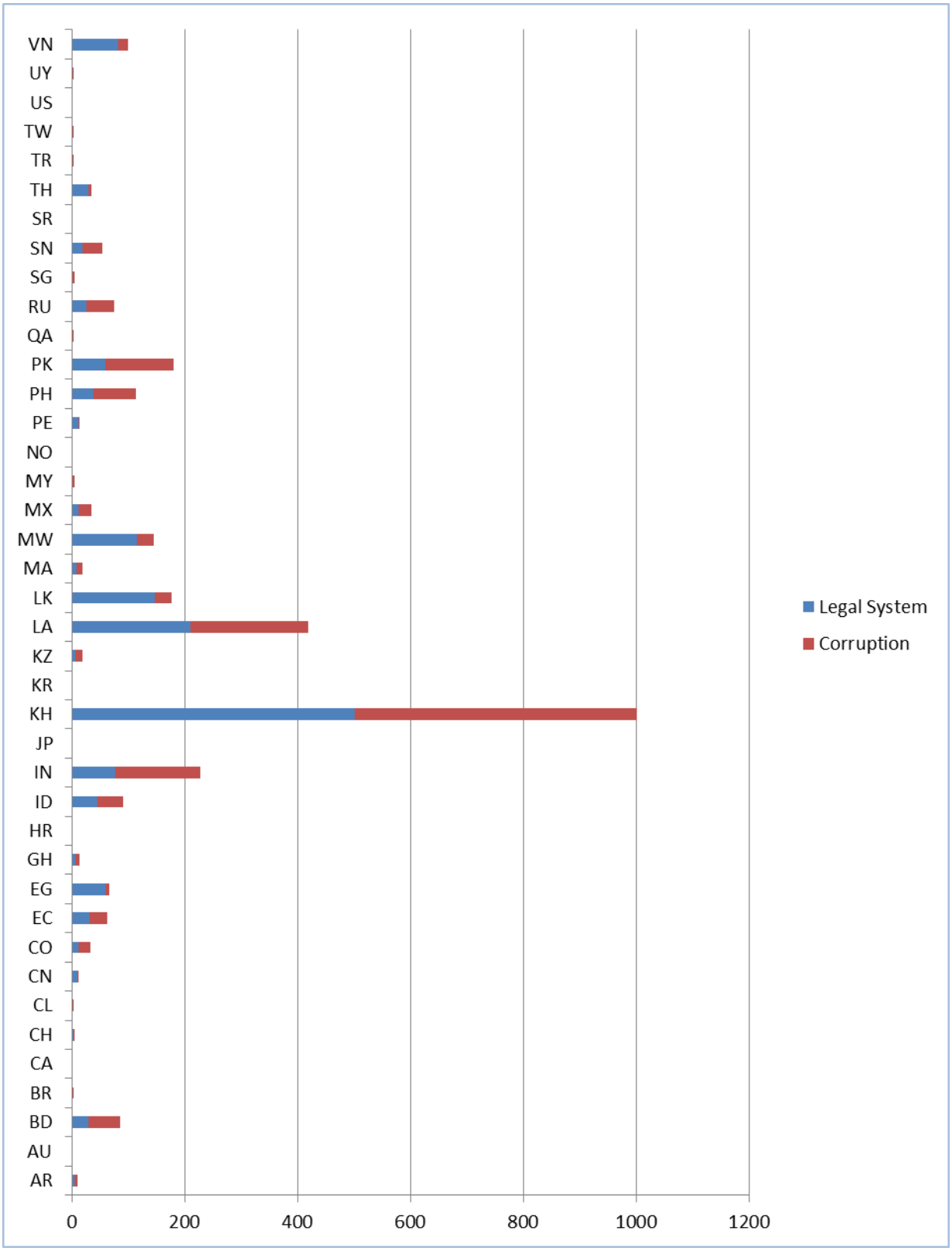


Figure 35. Comparing the overall sector-level *Community Infrastructure* performance (mrh-eq for total euros spent) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

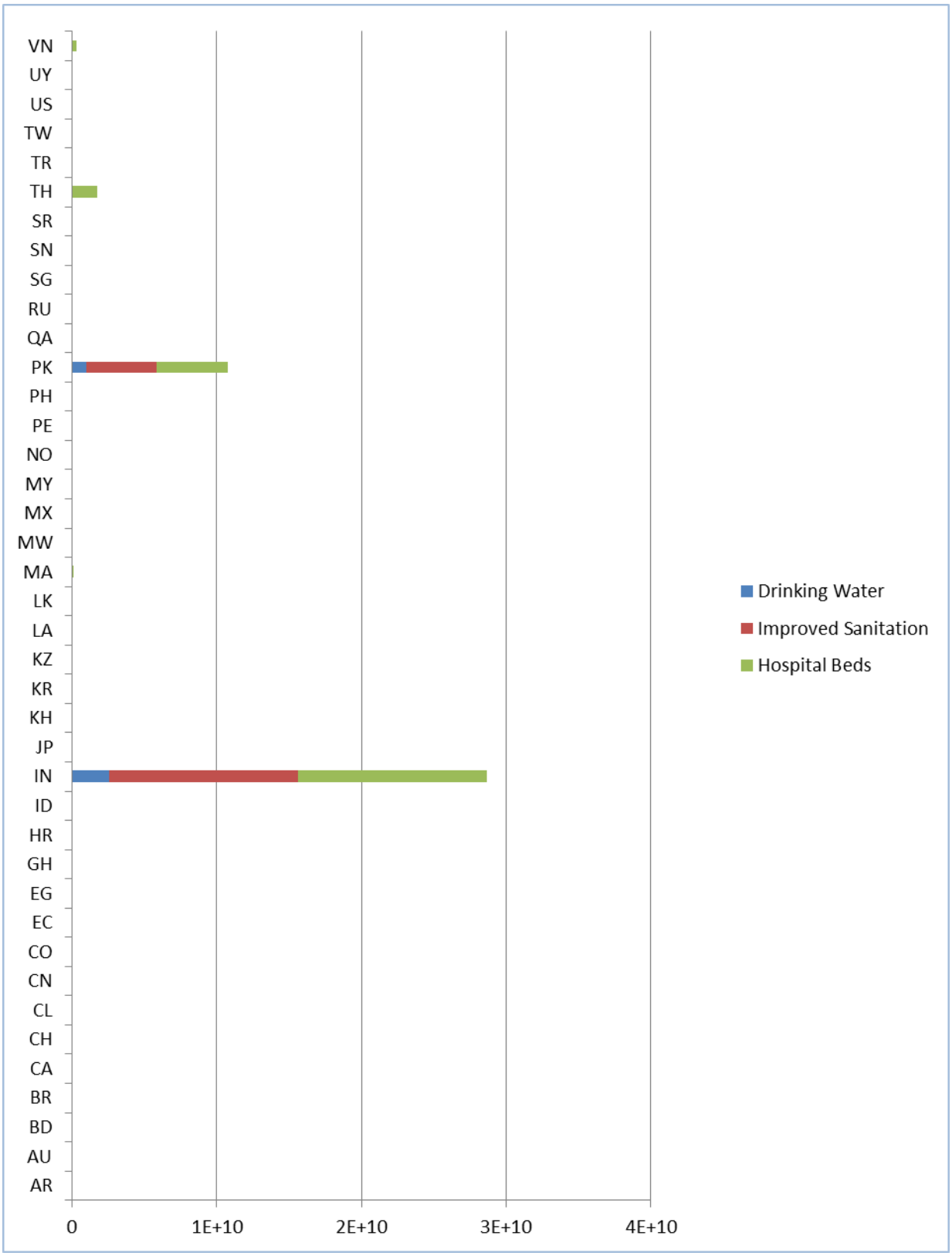


Figure 36. Comparing the sector-level *Community Infrastructure* performance (mrh-eq per euro spent in each country) of paddy rice imported into EU-27 Member States from extra-territorial trading partners in 2010.

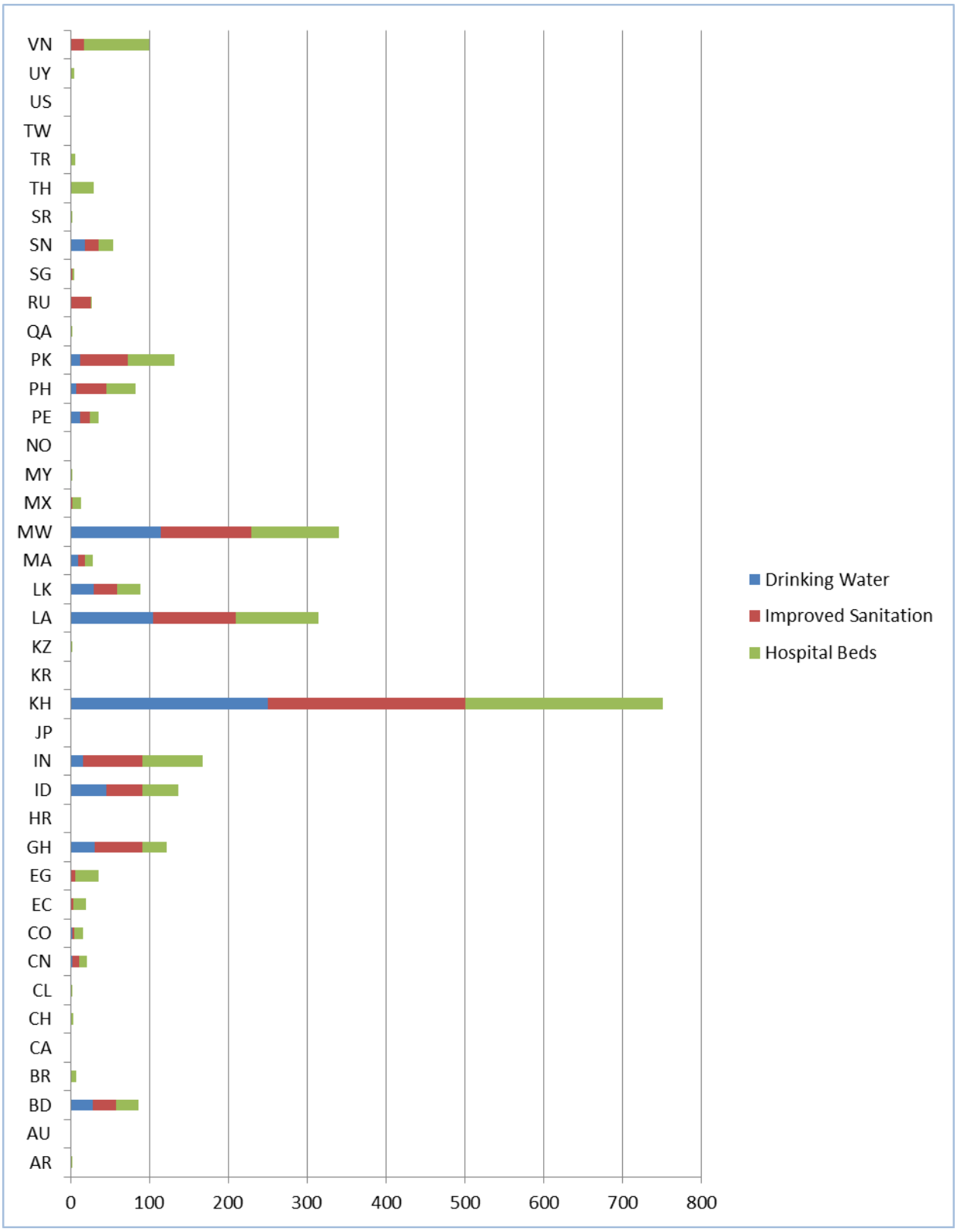


Figure 37. Distribution of single score social risk for the Paddy Rice sector in India (0.5% cut-off). Width of arrows reflects relative contribution to estimated risk.

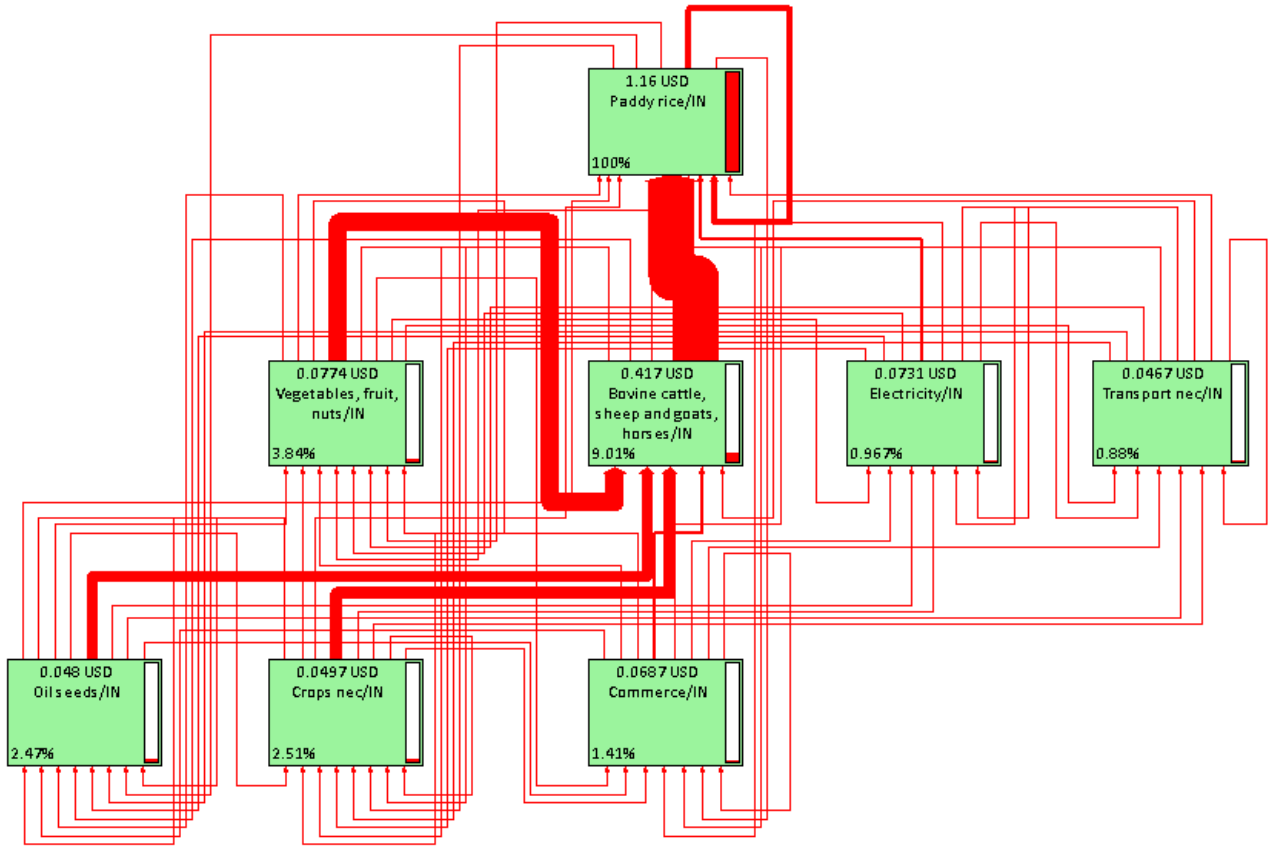
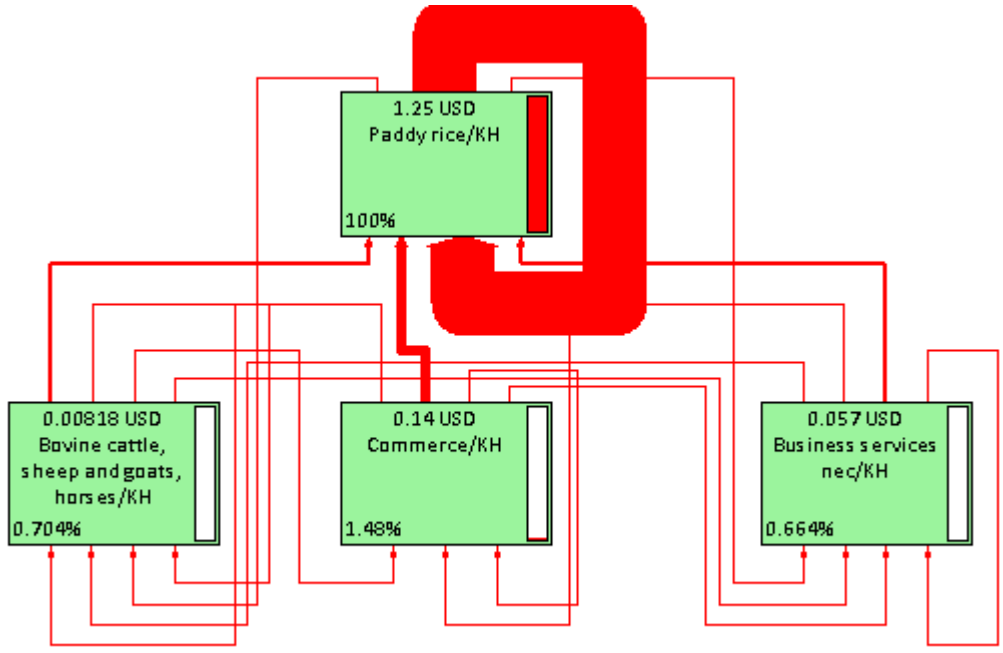


Figure 38. Distribution of single score social risk for the Paddy Rice sector in Cambodia (0.5% cut-off).



3.2.3 Social Risks for Intra- Versus Extra-territorial Electronic Equipment Imports

To illustrate the differing patterns of the distribution of social risks for imports of products from intra- compared to extra-territorial trading partners, we use as an example the German and Chinese Electronic Equipment sectors.

Considering the distribution of single score social risk attributable to imports from the German Electronics Equipment sector, it is clear that production in this sector is predicated on flows of materials and services from other sectors, much of this external to Germany itself. Only 25% of single score social risk is attributable to sectors based in Germany (among these are the Commerce sector (11%), the Business Services nec sector (4%), the Machinery and Equipment sector (2%) and the Metal products sector (2%). A small share actually occurs in the German Electronic Equipment sector, itself. The largest shares of single score social risks are attributable to activities in the Electronic Equipment sectors of extra-territorial countries, specifically: China (26%); Philippines (6%); Malaysia (5%); Taiwan (4%) and Japan (4%). Other contributing extra-territorial sectors include, for example, the Chinese Chemical, Rubber, Plastics Products sector (3%) and the Indian Business Services sector (2%). In total, the top 20 sectors that support activities in the German Electronic Equipment sector together contribute 89% of the single score social risks. Of these, 14 are extra-territorial and contribute over two thirds of this risk (Table 13).

Focusing in on specific social themes, of course, presents different distributions of social risk. Considering the magnitude and geographical distribution of risks of Forced Labour associated with the supply chains that support the German Electronics Equipment sector, for example, 56% of risk is attributable to the Chinese Electronic Equipment sector (and supporting flows into this sector), 7% to the Malaysian Electronic Equipment sector, 7% to the Chinese Chemical, Rubber, Plastic Products sector, and 7% to the German Commerce sector (in the case of the latter, these risks are primarily attributable to sectoral flows of material resources and services from extra-territorial countries) (Figure 39). Again, very little risk is actually attributable to activities in the German sector itself.

An examination of the single score social risks attributable to imports form the Chinese Electronics Equipment sector reveals a very different distribution of social risks. Here, single score social risks are, to a large extent, directly attributable to activities in the Chinese Electronic Equipment sector, itself. Moreover, of the top 20 supporting sectors for single score social risk, 15 of them are in China and together account for 54 of the 61% of risk attributable to these sectors (Table 13).

This trend is similarly apparent in the case of Forced Labour risks, where the largest share of risk is attributable to activities in the Chinese Electronic Equipment sector, itself, as well as other supporting Chinese sectors (Figure 40).

Table 13. Top 20 contributors to single score social risk (in %) among supply chain sectors supporting activities in the German and Chinese Electronic Equipment sectors.

Supporting Sector	Country	%	Supporting Sector	Country	%
Electronic equipment	China	26.2	Commerce	China	9.8
Commerce	Germany	10.5	Machinery and equipment	China	7.6
Electronic equipment	Phillipines	5.9	Chemical, rubber, plastic products	China	7.1
Electronic equipment	Malaysia	4.8	Mineral products nec	China	4.1
Electronic equipment	Taiwan	4.4	Business services nec	China	3.5
Electronic equipment	Japan	4.3	Transport nec	China	3.2
Business services nec	Germany	4.3	Financial services	China	3.1
Chemical, rubber, plastic products	China	3.2	Petroleum, coal products	China	3.1
Electronic equipment	Indonesia	3.1	Metal products	China	2.4
Electronic equipment	Thail	3.0	Electricity	China	2.3
Electronic equipment	Singapore	2.5	Electronic equipment	Taiwan	1.9
Machinery and equipment nec	Germany	2.4	Paper products, publishing	China	1.8
Electronic equipment	Korea	2.3	Ferrous metals	China	1.8
Business services nec	India	2.2	Electronic equipment	Malaysia	1.8
Metal products	Germany	1.9	Metals nec	China	1.7
Metals nec	Belgium	1.8	Water transport	China	1.4
Chemical, rubber, plastic products	Germany	1.7	Electronic equipment	Philipines	1.3
Metals nec	Germany	1.7	Electronic equipment	Japan	1.2
Electronic equipment	Turkey	1.6	Electronic equipment	Thailand	1.2
Metal products	China	1.4	Communication	China	1.2
		88.9			61.4

Figure 39. Distribution of Forced Labour risks (per euro spent) attributable to imports from the German Electronic Equipment sector (cut-off of 5%). Width of arrows reflects relative contribution to estimated risk.

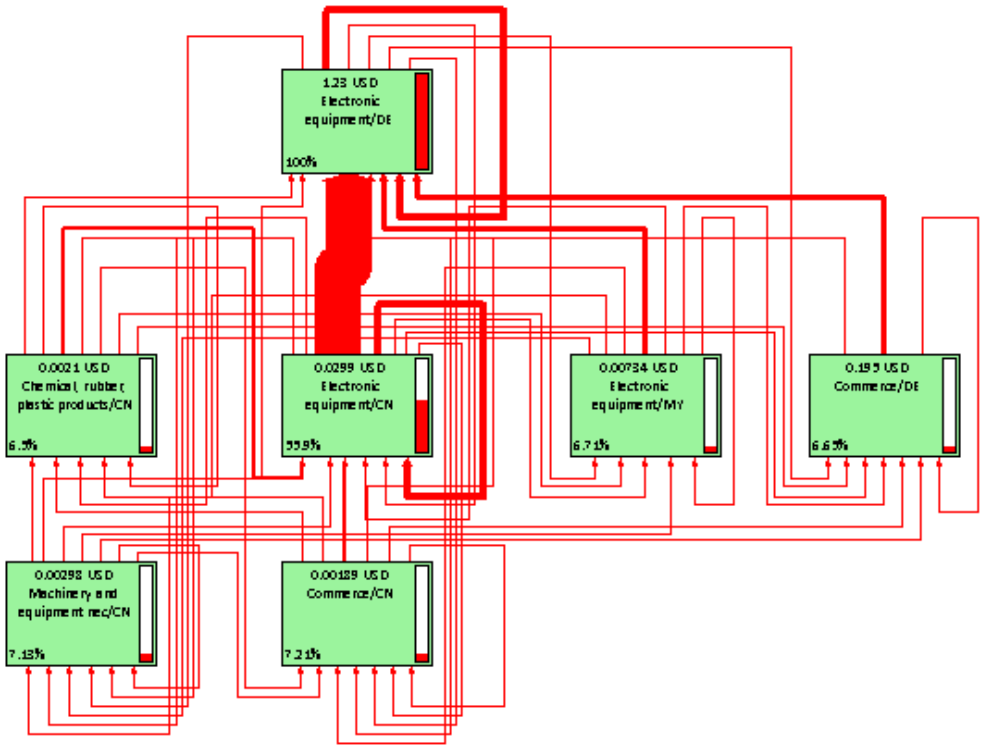
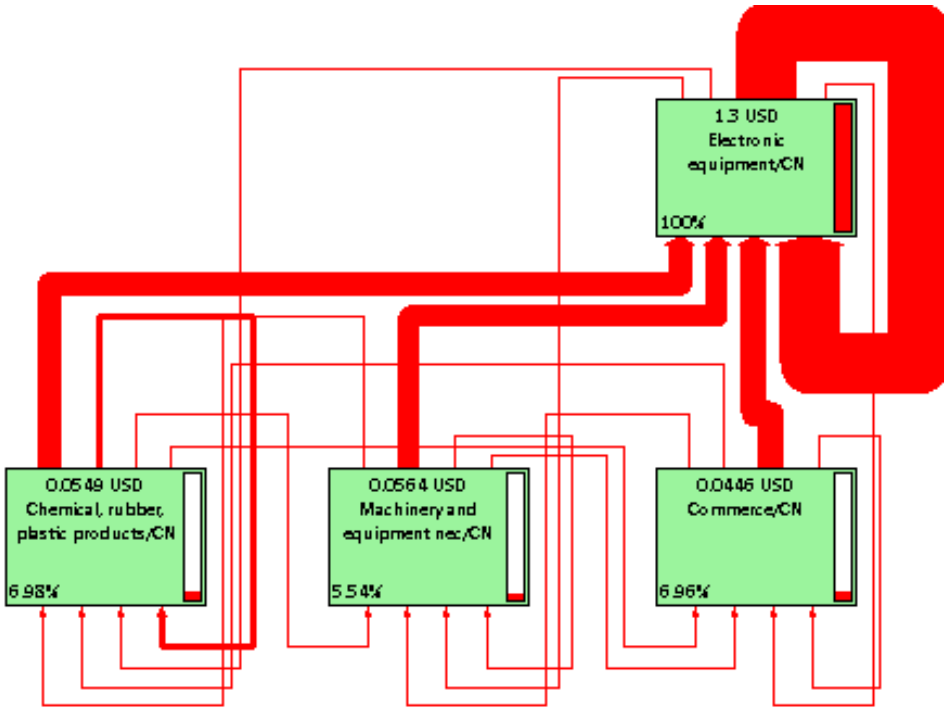


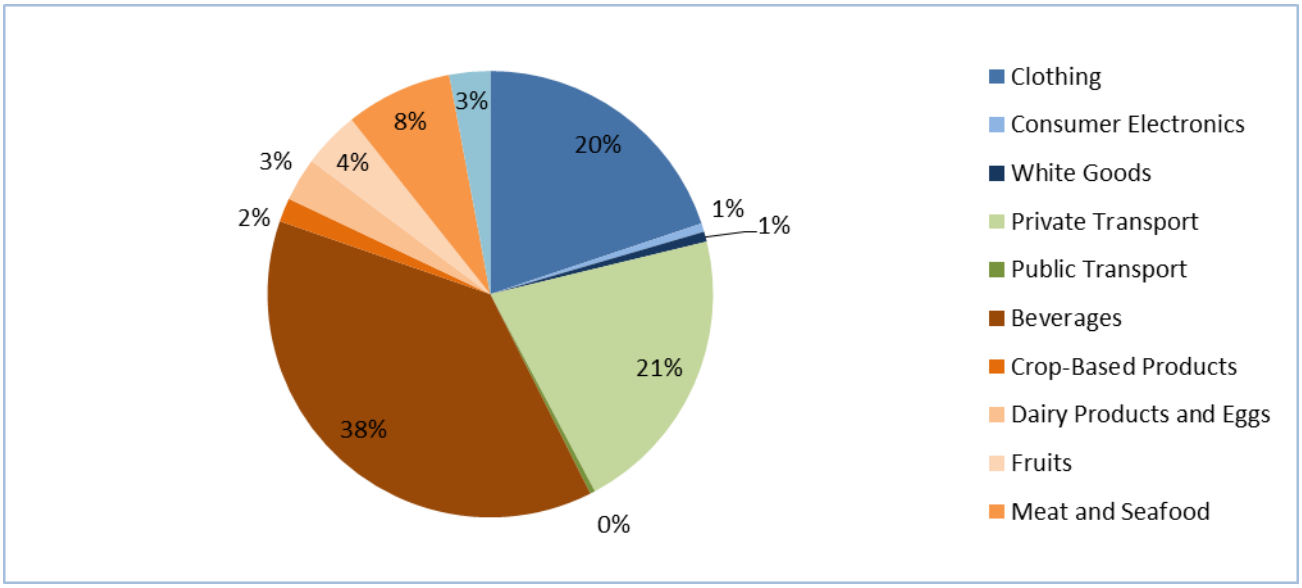
Figure 40. Distribution of Forced Labour risks (per euro spent) attributable to imports from the Chinese Electronic Equipment sector (cut-off of 5%).



3.3 Basket of Products Social Risk Indicator Results

For the production stage of representative products in the Basket of Products indicator (note that only three of five demand categories are considered here), single score social risk is most strongly influenced by the Nutrition category (58%), followed by the Consumer Goods and Mobility categories (21% each). The single largest contributors are Beverages (38%), Private Transport (21%) and Clothing (20%). Within the Beverages sub-category, coffee contributes disproportionately to the estimated single score social risk. The importance of the Nutrition category relative to the other two demand categories considered is, however, likely under-estimated given the fact that it is assumed that food products are sourced from intra-territorial imports.

Figure 41. Distribution of single score social risk among the representative products in the Basket of Products Indicator.



4. DISCUSSION AND CONCLUSIONS

Fostering social sustainability is an integral element of sustainable development. Improving social sustainability within Europe and abroad is also among the founding premises of the European Union. European Commission external policy documents – in particular, those associated with trade and development - explicitly call for the use of policy instruments as a means of improving social conditions in third countries. Unclear, however, is the extent to which progress in social sustainability as a result of Commission policy measures is actually being assessed, or measures to further leverage improved social sustainability implemented. Such information and supporting tools are critical in support of improved policy design, implementation, monitoring and/or reformulation.

According to Klopffer (2003, p. 158) "Life cycle thinking is the prerequisite of any sound sustainability assessment. It does not make any sense at all to improve (environmentally, economically, or socially) one part of the system in one country, in one step of the life cycle or in one environmental compartment, if this 'improvement' has negative consequences for other parts of the system which may outweigh the advantages achieved." Significant strides have already been made in the environmental domain to operationalize life cycle thinking in European Commission policies, with supporting methodological norms, frameworks, tools and data. To date, comparable approaches and instruments are lacking in support of life cycle-based social sustainability policy initiatives.

Social risk refers to the potential for one or more parties to be exposed to negative social conditions that, in turn, undermine social sustainability. We conducted a macro-scale analysis of the social risk profile of EU-27 imports by combining trade statistics regarding imports from intra- and extra-territorial trading partners in 2010 with country and sector-specific social risk indicator data in five thematic areas: Labour Rights and Decent Work; Health and Safety; Human Rights; Governance; and Community Infrastructure. We compared the apparent social risk profiles of EU-27 imports based on consideration of country/sector-of-origin social risk data only, compared to a life cycle-based social risk assessment which took into account the distribution of social risk along product supply chains. Our intention was to better understand how and to what extent current trade-based consumption in the EU-27 may be negatively impacting on social sustainability, and the value of applying a life cycle perspective in this context.

Our analysis underscores the importance of a life cycle-based approach to understanding and managing social risk in support of policies for socially sustainable development. Both approaches that we evaluated provide the same high-level insights that (1) the majority of social risks associated with imports to EU-27 countries are attributable to extra-territorial rather than intra-territorial imports, and (2) the risks of Injuries and Fatalities make the largest proportionate contribution to an overall, single-score measure of risk. However, these two approaches provide otherwise dissimilar "signals" as to the magnitude and distribution of social risk. The former approach would invariably prioritize interventions targeting only those direct trading partners known to have high levels of social risk in the sectors providing exports to EU-27 Member States. In contrast, the latter approach provides insight as to the distribution of risk along supply chains, which may be low in the sector of a given country exporting products to Europe, but high overall for those products due to the social risks associated with the activities that support production in that sector. Such supporting activities include physical

flows of inputs such as raw materials and energy, and also the activities of service sectors. The life cycle approach hence affords a much more nuanced consideration as to for whom, where, and to what extent social risk may be of particular concern.

Although we observe that the majority of social risk associated with total trade flows is attributable to extra-territorial imports, this is none-the-less also relevant for intra-territorial trade. If considering only country/sector-of-origin social risk, intra-territorial imports may appear to have low associated social risk. Consideration of the distribution of social risk along upstream supply chains, however, may provide a very different picture if inputs to production within specific sectors in EU-27 Member States come from extra-territorial trading partners with higher social risk profiles.

Targeted policy initiatives to mitigate social risk in the interest of leveraging improved social sustainability based on either of these approaches would hence prioritize different countries and sectors. For example, based on the country-of-origin approach, estimated single score social risk for total trade in 2010 is highest for the Motor Vehicles and Parts sector. In contrast, the Oil sector is, by a considerable margin, the most important contributor to overall social risk in the life cycle-based evaluation. Similarly, intra-territorial imports contribute 70% of estimated social risk in the Wood Products sector in the country-of-origin analysis, but only 23% in the life cycle-based evaluation. In the Paddy Rice sector, intra-territorial imports contribute 40% of estimated social risk for this sector in the country-of-origin analysis, but only 1% in the life cycle-based evaluation. The targets of policy measures informed by these different analytical approaches would obviously be quite different. These examples highlight the importance of applying life cycle thinking and supporting tools in order to ensure effective support to policies for socially sustainable development.

It should be noted, however, that in some sectors, considering country-of-origin social data may sometimes point towards similar policy prescriptions as would consideration of life cycle-based social risk data. This will be particularly the case for traded raw materials where the majority of supply chain activities are concentrated at the point of resource extraction or production – for example, for mining or agricultural crop production – with little minimal supporting activities from other sectors. In contrast, for manufactured goods whose production is supported by supply chains from other sectors and countries, country-of-origin data will likely not provide an accurate picture of the actual social risk profiles attributable to sectoral outputs. Domestic assembly of electronic equipment in low risk work environments in the EU using components from high social risk trading partners is illustrative of this potential.

This latter phenomenon will also be, to some extent, country-specific. For example, input flows for product manufacturing in some sectors and countries (e.g. Electronic equipment in China) tend to be internally-sourced. For other countries, including EU countries, input flows are more frequently sourced from external trading partners. This means that life cycle-based assessment of social risk is of particular relevance for evaluating domestic production in the EU. However, even for countries where input flows are predominately internal, differences in social risk attributable to different sectors within each country none-the-less underscore the utility of a life cycle-based approach to social risk evaluation and management.

Life cycle-based evaluations of social risk associated with production, consumption and trade may be used for policy support in different ways. At the highest level, assessments of overall commodity flows can provide an indication of the total magnitude and distribution of social risk – whether as a single score measure, or in terms

of specific thematic areas or social themes. For example, a policy measure intended to mitigate risk of child labour associated with consumption patterns in the EU could take, as its starting point, an assessment of total trade flows in order to determine which sectors and trading partners present the highest cumulative risk levels. It should be noted, however, that in some cases total risk may appear high due to the proportion by value of a trade flow from a specific country/sector rather than the actual risk score of that country/sector. For example, a large trade flow (by value) having a medium risk score will influence overall results much more than a small trade flow with a high associated risk level. Assessments per euro spent on products from each sector are hence also useful in that they can provide an indication of those sectors where risks are most acute, irrespective of the current magnitude of imports across sectors. This consideration is particularly relevant in order to prevent burden shifting from one country to another or from one dimension of social risk to another that could occur as result of policy-influenced changes in trade.

Based on the current analysis, an assessment of the single score social risk attributable to overall trade flows suggests that the Oil sector would be a priority area (here, Angola is a hotspot both in terms of overall trade and per euro spent between trading partners), whereas the Paddy Rice sector presents the most acute, single score social risk per euro spent (here, India ranks highest on the basis of trade volume, but not per euro spent among the different trading partners providing rice exports to the EU). More in-depth analyses subsequently allow for identifying key, high-risk trading partners, as well as contributing sectoral flows to production in individual countries, for the purpose of well-targeted policy initiatives.

Focusing on single scores is less useful if one wants to consider specific thematic areas or social themes, since single score results are disproportionately determined by Health and Safety risks. This underscores the importance of weighting schemes generally in determining the "signals" provided by an aggregated analytical result. Here, it is worthwhile considering development of a weighting scheme (or alternative weighting schemes) that are specifically tailored to reflect the priorities for different dimensions of social sustainability that have been established in European Commission policy documents. Such policy-specific weighting schemes would allow for better tailoring assessments of social risk in relation to policy priorities and, in turn, the development of effective policy responses. Since the SHDB currently supports evaluation of 17 separate social themes in five thematic areas, these may be used individually for evaluations designed to support specific policy objectives. For example, in light of the clear prioritization of promoting observance of fundamental labour rights in some EC external policies, focused analyses in this domain could provide strong support to policy design, implementation and assessment. Indeed, despite the importance given to mitigating social issues such as child labour, forced labour, and respect for fundamental labour rights in EC trade and development policy documents, our analysis suggests that social risks in these domains remain widespread along the supply chains of imports to the European Union. This underscores the value of evaluating the incidence of social risks associated with EU production and consumption such as presented in the current analysis as a basis for further policy initiatives to leverage improved social sustainability.

One priority area for implementation of life cycle-based evaluations of social risk in support of EC policy is further development/application of the methods described herein in direct complement to the European Commission (environmental) Life Cycle Indicators. Based on our preliminary implementation of these methods to the production stage of the Basket of Products Indicator, it appears feasible to similarly assess social risks for the use and end-of-life stages of the representative products considered in this indicator. For the use stage,

this will require the identification of conversion factors to re-express data such as energy consumption and person-km data in monetary units. For the end-of-life stage for representative products, the current methodology is somewhat limited in that the GTAP sector classifications aggregate end-of-life activities with other activities, hence resolution will be lower than for the other stages. Waste disposable and treatment is included under GTAP sector 56 (Other Services: Government), whereas recycling is included under GTAP sector 42 (Other Manufacturing: Recycling). The latter will be particularly important for assessing social risk for sectors such as the Electronic Equipment sector, where a fraction of end-of-life flows may be recycled in high-risk, third countries. Identification of less aggregated sectoral risk data for both waste management and recycling is hence desirable.

The methodology presented here can also be applied to developing a parallel, social risk monitoring tool in complement to the EC Resource Efficiency Indicator by using a combination of production (ProdCom) and trade (ComEx) data. Such a "Social Efficiency" indicator will allow for benchmarking and monitoring overall social risk associated with production and consumption in the European Union, including that associated with flows of internationally traded commodities. Moreover, coverage for both of these indicators can be extended to the Member State-level. In some respects, these parallel, social life cycle indicators will provide even better resolution than do the current, prototype environmental life cycle indicators. In the case of the social Basket of Products indicator, this is because it will be relatively easy to include all trading partners in the analysis, in place of the "major trading partner" approach currently applied in the prototype, environmental Basket of Products indicator. The representative products will also be based on sectoral product averages rather than single, representative products. For the "Social Efficiency" indicator, the analysis will be based on a common set of methods and data for both domestically produced and imported commodities. Most importantly, development of these complementary, social life cycle indicators will allow, for the first time, joint consideration of the life cycle social and environmental dimensions of EU production and consumption for the purpose of improved decision support. This will represent a significant step forward towards operationalizing the concept of the "European Sustainability Footprint" (Pelletier et al. 2013), which will require a suite of life cycle based environmental, social and economic indicators. Here, identifying targets/thresholds against which the social sustainability performance of EC policy alternatives can be assessed will be necessary. Indeed, some such targets/thresholds are already available in the form of domestic and international policy commitments – for example, the observance of fundamental labour rights as per the International Labour Organization norms already ratified by EU Member States. These further developments will also pave the way for scenario-modelling the potential social sustainability impacts of policy alternatives. Given that the methods applied here build on a global general equilibrium economic input-output model, this approach is certainly well suited for scenario assessment applications.

There are, however, several limitations to the current methodology which should be acknowledged. First, although the EU-27 traded with 227 countries in 2010, only 105 of these were included in the analysis on the basis of data availability. In terms of trade value, this limitation does not present a serious concern, since the 105 countries considered account for roughly 90% of EU-27 trade flows. However, in many cases, although they may account for very small volumes of trade, the remaining countries will often figure among the least developed countries where social risks may be most acute. It is hoped that future versions of GTAP will extend coverage to these countries, hence allowing their inclusion in life cycle-based social risk assessments using the SHDB on a robust basis.

Second, comparing social risks on the basis of value of trade flows is somewhat problematic in that imports and exports of otherwise similar products will usually have different values. An alternative approach would be to compare flows on the basis of physical units. Given that EuroStat Comex data is available on both mass and value bases, this should not be difficult to implement. Here, an annual table of sectoral conversion factors could be developed to facilitate analyses both on physical and monetary bases.

A third challenge relates to the relatively low level of granularity of sector categories (and supporting, sector-level data) in the Social Hotspots Database. For the current analysis, we mapped 6,279 HS06 codes from ComEx data to 43 GTAP sectors. Each of these sectors encompasses a wide variety of activities and production processes, which may potentially differ significantly in terms of attributable social risk. While data specificity at the product level is unnecessary for macro-scale assessments of social risk, an important area for further research will be to determine the extent to which the level of granularity afforded by the GTAP sector classifications is sufficient for specific policy support purposes. Future developments of the SHDB that use more finely resolved input-output databases may obviate any such concerns.

Finally, although the SHDB provides country/sector specific data wherever possible, in many instances only country-level data is currently available. Such instances reduce the resolution with which the distribution of social risk can be assessed. Again, future expanded versions of the SHDB will likely provide for increasingly resolved analyses.

European Commission policy documents, in particular those relevant to trade and development, suggest a strong commitment within the EU to contribute to socially sustainable development. Formulating, implementing, monitoring and, if necessary, revising policy measures in order to further this objective should be guided by novel and robust methodological frameworks, tools and data that can support nuanced decision making. The methods and information presented herein offer a potentially powerful decision-support tool for policy makers wishing to better understand the magnitude and distribution of social risk associated with EU production and consumption patterns, the mitigation of which will contribute to socially sustainable development within Europe and abroad. A novel opportunity hence presents itself for decision makers and those who provide scientific and technical support to policy making to collaborate closely in moving forward the agenda for socially sustainable development. This will require the identification of strategic directions and research projects, building upon existing, complementary environmental and economic sustainability assessment tools within the European Commission, which will continue to strengthen the elaboration of science-based policy for sustainable development.

5. WORKS CITED

Benoit, C., Norris, G., Valdivia, S., Ciroth, A., Moberg, A., Bos, U., Prakash, S., Ugaya, C., Beck, T. 2010a. The guidelines for social life cycle assessment of products: Just in time! Int. J. LCA 15:156-163.

Benoit, C., Norris, G., Aulisio, D., Rogers, S., Reed, J. and S. Overaker. 2010b. Social Hotspots Database. Risk and Opportunity Table Development. New Earth, New Hampshire, USA.

COM (2003) 302. Communication from the Commission to the Council and the European Parliament. Integrated Product Policy – Building on Environmental Life-Cycle Thinking. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2003:0302:FIN:en:PDF (last accessed September 2012).

COM (2005) 666. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0666:FIN:EN:PDF (last accessed September 2012).

COM (2005) 670. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Thematic Strategy on the Sustainable Use of Natural Resources. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0670:FIN:EN:PDF (last accessed September 2012).

COM (2008) 98. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:EN:PDF (last accessed September 2012).

COM (2008) 397. Communication for the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan. http://ec.europa.eu/environment/eussd/pdf/com_2008_397.pdf (last accessed September 2012).

COM (2010). Communication from the Commission. Europe 2020: A strategy for smart, sustainable and inclusive growth. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF (last accessed September 2012).

COM (2011) 21. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy. European Commission, Brussels. http://ec.europa.eu/resource-efficient-europe/pdf/resource_efficient_europe_en.pdf (last accessed September 2012).

COM (2009) 400. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Mainstreaming sustainable development

into EU policies: 2009 Review of the European Union Strategy for Sustainable Development. Available online: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0400:FIN:EN:PDF

Daly H and J Farley. 2004 Ecological Economics: Principles and Applications. Island Press, Washington.

Dreyer L., Hauschild M., Schierbeck J. 2006. A framework for social life cycle impact assessment, Int. J. LCA 11 (2):88-97.

EC. 2002. Communication: Corporate Social Responsibility – A Business Contribution to Sustainable Development. European Commission, Brussels.

European Council, 2001. Presidency Conclusions Göteborg European Council 15-16 June 2001. SN 200/1/01 REV 1. http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/00200-r1.en1.pdf (last accessed September 2012).

EC, 2000a. European Council, Conclusions of the Presidency. 7-10 December 2000, Nice. European Parliament.

EC, 2000b. Act: Statement by the Council and the Commission of 20 November 2000 on the European Community's development policy. European Commission, Brussels.

EC. 2000c. Communication: The follow-up to the first summit between Latin America, the Caribbean and the European Union. Final 670. European Commission, Brussels.

EC. 2001a. Communication: A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development. Final 264. European Commission, Brussels.

EC. 2001b. Communication: Promoting Core Labour Standards and Improving Social Governance in the Context of Globalisation. Final 416. European Commission, Brussels.

EC. 2001c. Communication: The European Union's Role in Promoting Human Rights and Democratisation. Final 252. European Commission, Brussels.

EC. 2001d. Green Paper: Promoting a European Framework for Corporate Social Responsibility. Final 366. European Commission, Brussels.

EC. 2001e. Communication: Europe and Asia: A Strategic Framework for Enhanced Partnerships. 469. European Commission, Brussels.

EC. 2002. Communication: Corporate Social Responsibility – A Business Contribution to Sustainable Development. Final 347. European Commission, Brussels.

EC. 2005. Communication: Reinforcing EU Disaster and Crisis Response in third countries. Final 153. European Commission, Brussels.

EC. 2006a. Communication: Implementing the Partnership for Growth and Jobs: Making Europe a Pole of Excellence on Corporate Social Responsibility. Final 136. European Commission, Brussels.

EC. 2006b. Communication: EU-Caribbean partnership for growth, stability and development. Final 86. European Commission, Brussels.

EC. 2007a. Communication: Towards an EU response to situations of fragility – engaging in difficult environments for sustainable development, stability and peace. Final 643. European Commission, Brussels.

EC. 2007b. White Paper: Together for Health: A strategic Approach for the EU 2008-2013. Final 630. European Commission, Brussels.

EC. 2007c. White Paper: A Strategy for Europe on Nutrition, Overweight and Obesity Related Health Issues. Final 279. European Commission, Brussels.

EC. 2008a. Consolidated Version of the Treaty on the Functioning of the European Union. Official Journal of the EU C115: 47-199.

EC. 2008b. Green Paper: The European Workforce for Health.725 Final. European Commission, Brussels.

EC. 2009a. Communication: Contributing to Sustainable Development: The Role of Fair Trade and Non-Governmental Trade-Related Sustainability Assurance Schemes. Final 215. European Commission, Brussels.

EC. 2009b. Communication: EU strategy for supporting disaster risk reduction in developing countries. Final 84. European Commission, Brussels.

EC. 2012. Life cycle indicators framework: development of life cycle based macro-level monitoring indicators for resources, products and waste for the EU-27. European Commission, Joint Research Centre - Institute for Environment and Sustainability.

EC. 2010. International Reference Life Cycle Data System (ILCD) Handbook. Institute for Environment and Sustainability, European Commission DG Joint Research Centre. Publications Office of the European Union, Luxembourg. Available online: http://lct.jrc.ec.europa.eu/assessment/projects.

Ekener-Petersen, E., Finnveden, G. 2013. Potential hotspots identified by social LCA – part 1: a case study of a laptop computer. Int. J. LCA 18:127-143.

Feschet, P., Macombe, C., Garrabé, M., Loeillet, D., Benhmad, F., Rolo Saez, A. 2013. Social impact assessment in LCA using the Preston Pathway-The case of banana industry in Cameroon, Int. J. LCA 18:490–503

GRI. 2006. G3 Guidelines. Global Reporting Initiative G3 GuidelinesGlobal Reporting Initiative, Amsterdam, Netherlands. https://www.globalreporting.org/reporting/G3andG3-1/g3-guidelines/Pages/default.aspx.

GSCP. 2012. Reference tools. Global Social Compliance Program, Paris, France. http://www.gscpnet.com/working-plan.html.

GTAP. 2013. Global trade analysis project, Purdue University, West Lafayette, Indiana. https://www.gtap.agecon.purdue.edu/.

ISO, 2006. ISO 14044. Environmental management – Life cycle assessment – Requirements and guidelines. International Organization for Standardization, Geneva.

ISO, 2010. ISO 26000. Social responsibility. International Organization for Standardization, Geneva.

Hunkeler, D., Rebitzer, G., 2001. Life Cycle Costing - Paving the Road to Sustainable Development? Int. J. Life Cycle Ass. 8(2), 109-110.

Jorgensen, A., Le Bocq, A., Nazarkina, L., Hauschild, M. 2008. Methodologies for social life cycle assessment. Int. J. LCA 13(2):96-103.

Jorgensen A., Lai L., Hauschild M. 2010. Assessing the validity of impact pathways for child labour and well-being in social life cycle assessment, Int. J. LCA 15:5-16.

Jorgensen A. 2013. Social LCA – A way ahead? International Journal of Life Cycle Assessment 18:296-299.

Lagarde, V., Macombe, C. 2013. Designing the social life cycle of products from the systematic competitive model, Int. J. LCA 18(1):172-184

Klopffer W. 2003. Life-cycle based methods for sustainable product development. Int. J. LCA 8(3):157-159.

Norris, G., 2001a. Integrating economic analysis into LCA. Environ. Qual. Manage. 10(3), 59-64.

Norris, G., 2001b. Integrating life cycle cost analysis and LCA. Int. J. LCA 6(2), 118-120.

Norris, G. 2006. Social impacts in product life cycles: towards life cycle attribute assessment. Int. J. LCA Special Issue 11:97-104.

O'Brien, M., Doig, A., Clift, R. 1996. Social and Environmental Life Cycle Assessment (SELCA) approach and methodological development. Int. J. LCA 1(4):231-237.

Parent, J.*et al.* 2010. Impact assessment in SLCA: sorting the sLCIA methods according to their outcomes. Int. J. LCA 15(2):164-171.

Pelletier, N., Maas, R., Goralczyk, M., Wolf, M.-A. 2013a. Conceptual basis for the development of the European Sustainability Footprint. Environmental Development. http://dx.doi.org/10.1016/j.envdev.2013.12.003.

Pelletier, N., Allacker, K., Pant, R., Manfredi, S. 2013. The European Commission Organisation Environmental Footprint method: comparison with other methods, and rationales for key requirements. Int. J. LCA. DOI 10.1007/s11367-013-0609-x.

Ramirez, P., Petti, L. 2011. The annals of the "Stefan cel Mare" University of Suceava 11(1): 11-17.

Reitinger, C., Dumke, M., Barosevcic, M., Hillerbrand, R. 2011. A conceptual framework for impact assessment within SLCA. Int. J. LCA 16:380–388.

Schmidt, I. *et al.* 2004. Managing sustainability of products and processes with the Socio-Eco-Efficiency Analysis by BASF. GMI 45:79-94.

Shapiro, K., 2001. Incorporating costs in LCA. Int. J. LCA 6(2), 121-123.

UNEP/SETAC. 2009. Guidelines for social life cycle assessment of products. The UNEP/SETAC Life Cycle Initiative.

Weidema, B. 2006. The integration of economic and social aspects in life cycle impact assessment. Int. J. LCA Special issue 11: 89-96.

White, A., Savage, D. Shapiro, K., 1996. Life Cycle Costing: Concepts and Applications. In Curran, M. (ed.): Environmental Life Cycle Assessment, McGraw-Hill, New York.

World Bank. 2013. World Integrated Trade Solution. HS Combined to GTAP. World Bank, New York. http://wits.worldbank.org/wits/product_concordance.html.

6. APPENDICES

APPENDIX A: Social Life Cycle Impact Assessment Methods V01.1

(1) CHARACTERIZATION			
WEIGHTING OF RISK LEVELS FOR CHARACTERIZATION OF SOCIAL RISKS FOR EACH INDICATOR IN MEDIUM RISK HOUR EQUIVALENT (mhr-eq) UNITS PER WORK HOUR (LR = low risk, MR = medium risk, HR = high risk, VHR = very high risk, URL = undefined risk level)			
Child Labour (CL)	**CL mrh eq**		
	Risk of Child Labour in sector, Total , HR	5	CL mrh eq / work hours
	Risk of Child Labour in sector, Total , LR	0.01	CL mrh eq / work hours
	Risk of Child Labour in sector, Total , MR	1	CL mrh eq / work hours
	Risk of Child Labour in sector, Total , VHR	10	CL mrh eq / work hours
Forced Labour (FL)	**FL mrh eq**		
	Risk of Forced Labour by Sector , HR	5	FL mrh eq / work hours
	Risk of Forced Labour by Sector , LR	0.01	FL mrh eq / work hours
	Risk of Forced Labour by Sector , MR	1	FL mrh eq / work hours
	Risk of Forced Labour by Sector , VHR	10	FL mrh eq / work hours
Excessive Working Time (EW)	**EW mrh eq**		
	Risk of excessive working time by sector , HR	5	EW mrh eq / work hours
	Risk of excessive working time by sector , LR	0.01	EW mrh eq / work hours
	Risk of excessive working time by sector , MR	1	EW mrh eq / work hours
	Risk of excessive working time by sector , VHR	10	EW mrh eq / work hours
Wage Assessment (WA)	**WA mrh eq**		
	Risk of Sector Average Wage being lower than Country's Non-poverty Guideline, HR	5	WA mrh eq / work hours
	Risk of Sector Ave Wage being lower than Country's Non-poverty Guideline, LR	0.01	WA mrh eq / work hours

	Risk of Sector Ave Wage being lower than Country's Non-poverty Guideline, MR	1	WA mrh eq / work hours
	Risk of Sector Ave Wage being lower than Country's Non-poverty Guideline, VHR	10	WA mrh eq / work hours
Poverty (PA)	**PA mrh eq**		
	Risk of Wages being under $2 per day, HR	5	PA mrh eq / work hours
	Risk of Wages being under $2 per day, LR	0.01	PA mrh eq / work hours
	Risk of Wages being under $2 per day, MR	1	PA mrh eq / work hours
	Risk of Wages being under $2 per day, URL	0.1	PA mrh eq / work hours
	Risk of Wages being under $2 per day, VHR	10	PA mrh eq / work hours
Migrant Labour (ML)	**ML mrh eq**		
	Risk that migrant workers are treated unfairly , LR	0.01	ML mrh eq / work hours
	Risk that migrant workers are treated unfairly , MR	1	ML mrh eq / work hours
	Risk that migrant workers are treated unfairly , URL	0.1	ML mrh eq / work hours
	Risk that migrant workers are treated unfairly , VHR	10	ML mrh eq / work hours
Collective Bargaining etc (CB)	**CB mrh eq**		
	Risk that a country lacks or does not enforce Collective Bargaining rights, HR	5	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Collective Bargaining rights, LR	0.01	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Collective Bargaining rights, MR	1	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Collective Bargaining rights, URL	0.1	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Collective Bargaining rights, VHR	10	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Freedom Oo Association rights, HR	5	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Freedom of Assocation rights, LR	0.01	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Freedom of Association rights, MR	1	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Freedom of Association rights, URL	0.1	CB mrh eq / work hours
	Risk that a country lacks or does not enforce Freedom of Association rights, VHR	10	CB mrh eq / work hours

	Risk that a country lacks or does not enforce the Right to Strike, HR	5	CB mrh eq / work hours
	Risk that a country lacks or does not enforce the Right to Strike, LR	0.01	CB mrh eq / work hours
	Risk that a country lacks or does not enforce the Right to Strike, MR	1	CB mrh eq / work hours
	Risk that a country lacks or does not enforce the Right to Strike, URL	0.1	CB mrh eq / work hours
	Risk that a country lacks or does not enforce the Right to Strike, VHR	10	CB mrh eq / work hours
Injuries & Fatalities (IF)	**IF mrh eq**		
	Risk of fatal injury by sector, HR	250	IF mrh eq / work hours
	Risk of fatal injury by sector, LR	0.5	IF mrh eq / work hours
	Risk of fatal injury by sector, MR	50	IF mrh eq / work hours
	Risk of fatal injury by sector, VHR	500	IF mrh eq / work hours
	Risk of non-fatal injuries by sector, HR	5	IF mrh eq / work hours
	Risk of non-fatal injuries by sector, LR	0.01	IF mrh eq / work hours
	Risk of non-fatal injuries by sector, MR	1	IF mrh eq / work hours
	Risk of non-fatal injuries by sector, VHR	10	IF mrh eq / work hours
Toxics & Hazards (TH)	**TH mrh eq**		
	Risk of loss of life by airborne particulates in occupation, HR	5	TH mrh eq / work hours
	Risk of loss of life by airborne particulates in occupation, MR	1	TH mrh eq / work hours
	Risk of loss of life by airborne particulates in occupation, VHR	10	TH mrh eq / work hours
	Risk of loss of life by airborne particulates. in occupation, LR	0.01	TH mrh eq / work hours
	Risk of loss of life or death by exposure to carcinogens in occupation, HR	5	TH mrh eq / work hours
	Risk of loss of life or death by exposure to carcinogens in occupation, LR	0.01	TH mrh eq / work hours
	Risk of loss of life or death by exposure to carcinogens in occupation, MR	1	TH mrh eq / work hours
	Risk of loss of life or death by exposure to carcinogens in occupation, VHR	10	TH mrh eq / work hours
	Risk of workplace noise exposure, both genders, HR	0.05	TH mrh eq / work hours

	Risk of workplace noise exposure, both genders, LR	0.0001	TH mrh eq / work hours
	Risk of workplace noise exposure, both genders, MR	0.01	TH mrh eq / work hours
	Risk of workplace noise exposure, both genders, VHR	0.1	TH mrh eq / work hours
Indigenous Rights (IR)	**IR mrh eq**		
	Risk that indigenous people are negatively impacted at sector level = not existing	0	IR mrh eq / work hours
	Risk that indigenous people are negatively impacted at sector level, VHR	10	IR mrh eq / work hours
Gender Equity (GE)	**GE mrh eq**		
	Overall Risk of Gender Inequality in country, HR	5	GE mrh eq / work hours
	Overall Risk of Gender Inequality in country, LR	0.01	GE mrh eq / work hours
	Overall Risk of Gender Inequality in country, MR	1	GE mrh eq / work hours
	Overall Risk of Gender Inequality in country, URL	0.1	GE mrh eq / work hours
	Overall Risk of Gender Inequality in country, VHR	10	GE mrh eq / work hours
High Conflict (HC)	**HC mrh eq**		
	Overall Risk for High Conflict-increased if risk exists at sector level, HR	5	HC mrh eq / work hours
	Overall Risk for High Conflict-increased if risk exists at sector level, LR	0.01	HC mrh eq / work hours
	Overall Risk for High Conflict-increased if risk exists at sector level, MR	1	HC mrh eq / work hours
	Overall Risk for High Conflict-increased if risk exists at sector level, URL	0.1	HC mrh eq / work hours
	Overall Risk for High Conflict-increased if risk exists at sector level, VHR	10	HC mrh eq / work hours
Legal System (LS)	**LS mrh eq**		
	Risk of fragility in the legal system considering all indicators, HR	5	LS mrh eq / work hours
	Risk of fragility in the legal system considering all indicators, LR	0.01	LS mrh eq / work hours
	Risk of fragility in the legal system considering all indicators, MR	1	LS mrh eq / work hours
	Risk of fragility in the legal system considering all indicators, VHR	10	LS mrh eq / work hours
Corruption (CO)	**CO mrh eq**		

	Overall Risk of Corruption considering all indicators, HR	5	CO mrh eq / work hours
	Overall Risk of Corruption considering all indicators, LR	0.01	CO mrh eq / work hours
	Overall Risk of Corruption considering all indicators, MR	1	CO mrh eq / work hours
	Overall Risk of Corruption considering all indicators, VHR	10	CO mrh eq / work hours
Drinking Water (DW)	**DW mrh eq**		
	Risk of no access to an Improved Source of Drinking Water, HR	5	DW mrh eq / work hours
	Risk of no access to an Improved Source of Drinking Water, LR	0.01	DW mrh eq / work hours
	Risk of no access to an Improved Source of Drinking Water, MR	1	DW mrh eq / work hours
	Risk of no access to an Improved Source of Drinking Water, URL	0.1	DW mrh eq / work hours
	Risk of no access to an Improved Source of Drinking Water VHR	10	DW mrh eq / work hours
Improved Sanitation (IS)	**IS mrh eq**		
	Risk of no access to an Improved source of Sanitation, HR	5	IS mrh eq / work hours
	Risk of no access to an Improved source of Sanitation, LR	0.01	IS mrh eq / work hours
	Risk of no access to an Improved source of Sanitation, MR	1	IS mrh eq / work hours
	Risk of no access to an Improved source of Sanitation, URL	0.1	IS mrh eq / work hours
	Risk of no access to an Improved source of Sanitation, VHR	10	IS mrh eq / work hours
Hospital Beds (HB)	**HB mrh eq**		
	Risk that there are too few hospital beds to support population, URL	0.1	HB mrh eq / work hours
	Risk that there are too few hospital beds to support population, HR	5	HB mrh eq / work hours
	Risk that there are too few hospital beds to support population, LR	0.01	HB mrh eq / work hours
	Risk that there are too few hospital beds to support population, MR	1	HB mrh eq / work hours

(2) DAMAGE ASSESSMENT

WEIGHTING OF SOCIAL THEMES FOR CALCULATION OF RESULTS FOR THEMATIC AREAS IN MEDIUM RISK HOUR EQUIVALENT UNITS

Damage category	**Labour Rights & Decent Work**	CL mhr eq
Child Labour	1	CL mhr eq / CL mrh eq
Forced Labour	1.5	CL mhr eq / FL mrh eq
Excessive Working Time	1	CL mhr eq / EW mrh eq
Wage Assessment	1	CL mhr eq / WA mrh eq
Poverty	1	CL mhr eq / PA mrh eq
Migrant Labour	1	CL mhr eq / ML mrh eq
Collective Bargaining etc	1	CL mhr eq / CB mrh eq
Damage category	**Health & Safety**	IF mrh eq
Injuries & Fatalities	1	IF mrh eq / IF mrh eq
Toxics & Hazards	1	IF mrh eq / TH mrh eq
Damage category	**Human Rights**	GE mrh eq
Indigenous Rights	1	GE mrh eq / IR mrh eq
Gender Equity	1	GE mrh eq / GE mrh eq
High Conflict	1	GE mrh eq / HC mrh eq
Damage category	**Governance**	LS mrh eq
Legal System	1	LS mrh eq / LS mrh eq
Corruption	1	LS mrh eq / CO mrh eq
Damage category	**Community Infrastructure**	DW mrh eq
Drinking Water	1	DW mrh eq / DW mrh eq
Improved Sanitation	1	DW mrh eq / IS mrh eq
Hospital Beds	1	DW mrh eq / HB mrh eq

(3) SINGLE SCORE MEASURE OF SOCIAL RISK	
WEIGHTING OF THEMATIC AREAS FOR CALCULATION OF A SINGLE SCORE IN MEDIUM RISK HOUR EQUIVALENT UNITS	
Weighting	
Labour Rights & Decent Work	1
Health & Safety	1
Human Rights	1
Governance	0.5
Community Infrastructure	0.5
SPECIFIC SUB- INDICATORS USED TO CALCULATE INDICATOR RESULTS	
Labour Rights & Decent Work	
Child Labour	
Risk of Child Labour in sector, Female (used country-level risk where no sector data was found)	
Risk of Child Labour in sector, Male (used country-level risk where no sector data was found)	
Risk of Child Labour in sector, Total (used country-level risk where no sector data was found)	
Risk of Female Child Labour in country	
Risk of Male Child labour in country	
Risk of Total Child Labour in country	
Forced Labour	
Characterization of ILO's Forced Labour Regional Estimates	
Characterization of U.S. DOL's Trafficking in Person's Forced Labour Tiers	
Risk of Forced Labour by Sector (used country level risk [not shown] if no sector data was found)	
Risk of Forced Labour in Country according to Qualitative Sources	
Freedom of Association, Collective Bargaining, and Right to Strike	
Risk that a country lacks or does not enforce Collective Bargaining rights	
Risk that a country lacks or does not enforce Freedom of Association rights	
Risk that a country lacks or does not enforce the Right to Strike	
Labour Laws	
Risk that Country does not provide adequate labour laws	
Risk that Country does not provide adequate labour laws by Sector (used country level risk where sector data not available)	
Risk that Country does not ratify ILO conventions by Sector (used country level data where sector data not available)	
Risk that Country has not ratified ILO conventions	

Risk that Minimum Wage has not been updated
Migrant Workers
Characterization of population that are immigrants
Characterization of the number of emigrants
Characterization of the number of immigrants
that a country does not pay immigrants enough for remittances
Risk that a country has not ratified international conventions or set up policies for immigrants1
Risk that a country has not ratified international conventions or set up policies for immigrants2
Risk that a country has not ratified international conventions or set up policies for immigrants3
Risk that a country has not ratified international conventions or set up policies for immigrants4
Risk that a country's remittances from its emigrants is low
Risk that migrant workers are treated unfairly (based on qualitative literature review)
Risk that NMR is very high or very low (high max)
Risk that women are not accepted into country as immigrants
Poverty
Risk of Wages being under $2 per day
Unemployment
Risk of Unemployment by Sector
Risk of Unemployment in Country
Wage Assessment
Risk of Sector Ave Wage being lower than Country's Minimum Wage
Risk of Sector Ave Wage being lower than Country's Non-poverty Guideline
Working Time
Risk of excessive working time by sector (used country level risk [not shown] where no sector data exists)
Health & Safety
Occupational Injuries & Deaths
Risk of fatal injury by sector
Risk of fatality from a disease due to occupation at country level
Risk of non-fatal injuries by sector
Occupational Toxics & Hazards
Risk of contracting Hep B or C or HIV from a sharps injury working in the health care sector
Risk of death by leukemia due to occupation
Risk of death by lung cancer due to occupation
Risk of death by mesothelioma due to occupation
Risk of loss of life by airborne particulates in occupation
Risk of loss of life or death by exposure to carcinogens in occupation
Risk of loss of life years by asbestosis due to airborne particulates in occupation
Risk of loss of life years by asthma due to airborne particulates in occupation

Risk of loss of life years by chronic obstructive pulmonary disease due to airborne particulates in occupation
Risk of loss of life years by leukemia due to occupation
Health & Safety: Occupational Toxics & Hazards: Risk of loss of life years by lung cancer due to occupation
Risk of loss of life years by mesothelioma due to occupation
Risk of loss of life years by miners' pneumoconiosis due to working in coal mines
Risk of loss of life years by silicosis due to airborne particulates in occupation
Risk of workplace noise exposure to females
Risk of workplace noise exposure to males
Risk of workplace noise exposure, both genders
Human Rights
Gender Equity
Characterization of Cingranelli-Richards Human Rights Dataset3
Characterization of CIRI1
Characterization of CIRI2
Characterization of GGG
Characterization of GII
Characterization of SIGI
Overall Risk of Gender Inequality in country
Risk of Gender inequality by Sector based on representation in the workforce
High Conflict Zones
Characterization of Heidelberg Barometer1
Characterization of Heidelberg Barometer2
Characterization of Heidelberg Barometer3
Characterization of People Under Threat Score
Characterization of Refugees
Characterization of State Fragility Index
Overall Risk for High Conflict-increased if risk exists at sector level
Human Health - Communicable Diseases
Risk of Dengue Fever
Risk of Diphtheria
Risk of HIV
Risk of Japanese encephalitis
Risk of malaria
Risk of Measles
Risk of mortality from communicable diseases
Risk of Mumps
Risk of Pertussis
Risk of Poliomyelitis
Risk of Rubella
Risk of Tetanus
Risk of Tuberculosis

Human Health - Non-communicable Diseases and other health risks
Risk of Dying from Diabetes (mellitus)
Risk of a high Under-five mortality rate
Risk of Death due to indoor and outdoor air and water pollution
Risk of dying from Cardiovascular diseases
Risk of dying from Cerebrovascular disease
Risk of Dying from Digestive diseases
Risk of dying from Malignant neoplasms
Risk of dying from Neuropsychiatric conditions
Risk of low Life expectancy
Risk of mortality from injury
Risk of mortality from non-communicable diseases
Risk of Obesity (BMI = 30 kg/m²), Aged 15+, Males
Risk of Obesity (BMI = 30 kg/m²), Aged 15+,Females
Risk of Respiratory diseases
Risk of undernourishment
Risk that Population may be affected by natural disasters
Indigenous Rights
Characterization of Indigenous Population
Risk that indigenous people are negatively impacted at sector level
Governance
Corruption
Overall Risk of Corruption considering all indicators
Risk that a country ranks poorly for corruption perception
Risk that a country ranks poorly on the World Bank Worldwide Governance Indicator's Corruption Index
Risk that corruption is a hinder to doing business in a country
Risk that corruption is increasing in a country over the last 3 years
Legal System
Characterization of BTI Rule of Law
Characterization of Cingranelli-Richards Human Rights Dataset - Independent Judiciary
Characterization of GII
Characterization of WGI Rule of Law
Governance: Legal System: Characterization of WJP
Risk of fragility in the legal system considering all indicators
Community Infrastructure
Access to Hospital Beds
Risk that there are too few hospital beds to support population
Access to Improved Drinking Water
Risk of no access to an Improved Source of Drinking Water

Risk of no rural access to an Improved Source of Drinking Water
Risk of no urban access to an Improved Source of Drinking Water
Access to Improved Sanitation
Risk of no access to an Improved source of Sanitation
Risk of no rural access to an Improved source of Sanitation
Risk of no urban access to an Improved source of Sanitation
Children Out of School
Risk that children do not attend school, total only
Smallholder v. Commercial Farms
Characterization of commercial labour
Characterization of family labour
Characterization of large land holdings
Characterization of small land holdings

APPENDIX B: GTAP Sector Numbers, Codes, and Detailed Descriptions (sectors in *italics* not included in the current analysis)

Number	Code	Description
1	pdr	Paddy Rice: rice, husked and unhusked
2	wht	Wheat: wheat and meslin
3	gro	Other Grains: maize (corn), barley, rye, oats, other cereals
4	v_f	Veg & Fruit: vegetables, fruits and vegetables, fruit and nuts, potatoes, cassava, truffles,
5	osd	Oil Seeds: oil seeds and oleaginous fruit; soy beans, copra
6	c_b	Cane & Beet: sugar cane and sugar beet
7	pfb	Plant Fibres: cotton, flax, hemp, sisal and other raw vegetable materials used in textiles
8	ocr	Other Crops: live plants; cut flowers and flower buds; flower seeds and fruit seeds; vegetable seeds, beverage and spice crops, unmanufactured tobacco, cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form of pellets; swedes, mangolds, fodder roots, hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches and similar forage products, whether or not in the form of pellets, plants and parts of plants used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes, sugar beet seed and seeds of forage plants, other raw vegetable materials
9	ctl	Cattle: cattle, sheep, goats, horses, asses, mules, and hinnies; and semen thereof
10	oap	Other Animal Products: swine, poultry and other live animals; eggs, in shell (fresh or cooked), natural honey, snails (fresh or preserved) except sea snails; frogs' legs, edible products of animal origin n.e.c., hides, skins and furskins, raw , insect waxes and spermaceti, whether or not refined or coloured
11	*rmk*	*Raw milk*
12	wol	Wool: wool, silk, and other raw animal materials used in textile
13	frs	Forestry: forestry, logging and related service activities
14	fsh	Fishing: hunting, trapping and game propagation including related service activities, fishing, fish farms; service activities incidental to fishing
15	coa	Coal: mining and agglomeration of hard coal, lignite and peat
16	oil	Oil: extraction of crude petroleum and natural gas (part), service activities incidental to oil and gas extraction excluding surveying (part)
17	gas	Gas: extraction of crude petroleum and natural gas (part), service activities incidental to oil and gas extraction excluding surveying (part)
18	omn	Other Mining: mining of metal ores, uranium, gems. other mining and quarrying
19	cmt	Cattle Meat: fresh or chilled meat and edible offal of cattle, sheep, goats, horses, asses, mules, and hinnies. raw fats or grease from any animal or bird.
20	omt	Other Meat: pig meat and offal. preserves and preparations of meat, meat offal or blood, flours, meals and pellets of meat or inedible meat offal; greaves

21	vol	Vegetable Oils: crude and refined oils of soya-bean, maize (corn),olive, sesame, ground-nut, olive, sunflower-seed, safflower, cotton-seed, rape, colza and canola, mustard, coconut palm, palm kernel, castor, tung jojoba, babassu and linseed, perhaps partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised. Also margarine and similar preparations, animal or vegetable waxes, fats and oils and their fractions, cotton linters, oil-cake and other solid residues resulting from the extraction of vegetable fats or oils; flours and meals of oil seeds or oleaginous fruits, except those of mustard; degras and other residues resulting from the treatment of fatty substances or animal or vegetable waxes.
22	mil	Milk: dairy products
23	pcr	Processed Rice: rice, semi- or wholly milled
24	sgr	Sugar
25	ofd	Other Food: prepared and preserved fish or vegetables, fruit juices and vegetable juices, prepared and preserved fruit and nuts, all cereal flours, groats, meal and pellets of wheat, cereal groats, meal and pellets n.e.c., other cereal grain products (including corn flakes), other vegetable flours and meals, mixes and doughs for the preparation of bakers' wares, starches and starch products; sugars and sugar syrups n.e.c., preparations used in animal feeding, bakery products, cocoa, chocolate and sugar confectionery, macaroni, noodles, couscous and similar farinaceous products, food products n.e.c.
26	b_t	Beverages and Tobacco products
27	tex	Textiles: textiles and man-made fibres
28	wap	Wearing Apparel: Clothing, dressing and dyeing of fur
29	lea	Leather: tanning and dressing of leather; luggage, handbags, saddlery, harness and footwear
30	lum	Lumber: wood and products of wood and cork, except furniture; articles of straw and plaiting materials
31	ppp	Paper & Paper Products: includes publishing, printing and reproduction of recorded media
32	p_c	Petroleum & Coke: coke oven products, refined petroleum products, processing of nuclear fuel
33	crp	Chemical Rubber Products: basic chemicals, other chemical products, rubber and plastics products
34	nmm	Non-Metallic Minerals: cement, plaster, lime, gravel, concrete
35	i_s	Iron & Steel: basic production and casting
36	nfm	Non-Ferrous Metals: production and casting of copper, aluminium, zinc, lead, gold, and silver
37	fmp	Fabricated Metal Products: Sheet metal products, but not machinery and equipment
38	mvh	Motor vehicles and parts: cars, lorries, trailers and semi-trailers
39	otn	Other Transport Equipment: Manufacture of other transport equipment
40	ele	Electronic Equipment: office, accounting and computing machinery, radio, television and communication equipment and apparatus

41	ome	Other Machinery & Equipment: electrical machinery and apparatus n.e.c., medical, precision and optical instruments, watches and clocks
42	omf	Other Manufacturing: includes recycling
43	ely	Electricity: production, collection and distribution
44	gdt	Gas Distribution: distribution of gaseous fuels through mains; steam and hot water supply
45	*wtr*	*Water: collection, purification and distribution*
46	*cns*	*Construction: building houses factories offices and roads*
47	*trd*	*Trade: all retail sales; wholesale trade and commission trade; hotels and restaurants; repairs of motor vehicles and personal and household goods; retail sale of automotive fuel*
48	*otp*	*Other Transport: road, rail ; pipelines, auxiliary transport activities; travel agencies*
49	*wtp*	*Water transport*
50	*atp*	*Air transport*
51	*cmn*	*Communications: post and telecommunications*
52	*ofi*	*Other Financial Intermediation: includes auxiliary activities but not insurance and pension funding (see next)*
53	*isr*	*Insurance: includes pension funding, except compulsory social security*
54	*obs*	*Other Business Services: real estate, renting and business activities*
55	*ros*	*Recreation & Other Services: recreational, cultural and sporting activities, other service activities; private households with employed persons (servants)*
56	*osg*	*Other Services (Government): public administration and defense; compulsory social security, education, health and social work, sewage and refuse disposal, sanitation and similar activities, activities of membership organizations n.e.c., extra-territorial organizations and bodies*
57	*dwe*	*Dwellings: ownership of dwellings (imputed rents of houses occupied by owners)*

APPENDIX C: United Nations 2-Digit Country Codes

AL	Albania	**LA**	Laos
AM	Armenia	**LK**	Sri Lanka
AO	Angola	**LT**	Lithuania
AR	Argentina	**LU**	Luxembourg
AT	Austria	**LV**	Latvia
AU	Australia	**MA**	Morocco
AZ	Azerbaijan	**MD**	Moldova, Republic of
BD	Bangladesh	**MG**	Madagascar
BE	Belgium	**MM**	Myanmar
BG	Bulgaria	**MO**	Macau, China
BO	Bolivia	**MT**	Malta
BR	Brazil	**MU**	Mauritius
BW	Botswana	**MW**	Malawi
BY	Belarus	**MX**	Mexico
BZ	Belize	**MY**	Malaysia
CA	Canada	**MZ**	Mozambique
CH	Switzerland	**NA**	Namibia
CL	Chile	**NG**	Nigeria
CN	China	**NI**	Nicaragua
CO	Colombia	**NL**	Netherlands
CR	Costa Rica	**NO**	Norway
CS	Serbia	**NP**	Nepal
CY	Cyprus	**NZ**	New Zealand
CZ	Czech Republic	**PA**	Panama
DE	Germany	**PE**	Peru
DK	Denmark	**PG**	Papua New Guinea
DO	Dominican Republic	**PH**	Philippines
DZ	Algeria	**PK**	Pakistan
EC	Ecuador	**PL**	Poland
EE	Estonia	**PT**	Portugal
EG	Egypt	**PY**	Paraguay
ES	Spain	**QA**	Qatar
ET	Ethiopia	**RO**	Romania
FI	Finland	**RU**	Russian Federation
FR	France	**SE**	Sweden
GB	United Kingdom	**SG**	Singapore
GE	Georgia	**SI**	Slovenia
GH	Ghana	**SK**	Slovakia
GL	Greenland	**SN**	Senegal
GQ	Equatorial Guinea	**SR**	Suriname

GR	Greece	**TH**	Thailand
GT	Guatemala	**TL**	Timor Leste
HK	Hong Kong	**TN**	Tunisia
HR	Croatia	**TR**	Turkey
HU	Hungary	**TW**	Taiwan
ID	Indonesia	**TZ**	Tanzania, United Republic of
IE	Ireland	**UA**	Ukraine
IN	India	**UG**	Uganda
IR	Iran, Islamic Republic of	**US**	United States of America
IS	Iceland	**UY**	Uruguay
IT	Italy	**UZ**	Uzbekistan
JP	Japan	**VE**	Venezuela
KE	Kenya	**VN**	Vietnam
KG	Kyrgyzstan	**ZA**	South Africa
KH	Cambodia	**ZM**	Zambia
KR	Korea, Republic of	**ZW**	Zimbabwe
KZ	Kazakhstan		

APPENDIX D: Summary of Relevant EU Legislation by Social Risk Indicator

Social risk Indicator	EU Legislation
Risk of Child Labour	*COM (2001)* 416 Final. Commission Communication on Promoting Core Labour Standards and Improving Social Governance in the Context of Globalisation. Section 5.2.2 (see EC, 2001b).
	Regulation (EC) No 1889/2006 of the European Parliament and of the Council of 20 December 2006 on establishing a financing instrument for the promotion of democracy and human rights worldwide (Article 2, 1B in Appendix A.1).
Risk of Forced Labour	*Ibid.*, Article 2, 1B in Appendix A.1.
Risk of Low Wage, Unemployment, and Excessive Working Time	*Decision No 283/2010/EU* of the European Parliament and of the Council of 25 March 2010 establishing a European Progress Microfinance Facility for employment and social inclusion (Appendix A.5).
	Regulation (EC) No 1889/2006 of the European Parliament and of the Council of 20 December 2006 on establishing a financing instrument for the promotion of democracy and human rights worldwide (Appendix A.1).
	Council Directive 2003/88/EC of the European Parliament and of the Council of 4 November 2003 concerning certain aspects of the organisation of working time (Appendix A.6).
	Council Directive 96/71/EC of the European Parliament and of the Council of 16 December 1996 concerning the posting of workers in the framework of the provision of services.
	Council Directive 75/117/EEC of 10 February 1975 on the approximation of the laws of the Member States relating to the application of the principle of equal pay for men and women.
Characterisation of Migrant Workers, Refugees, and Indigenous People	Regulation (EC) No 1889/2006 of the European Parliament and of the Council of 20 December 2006 on establishing a financing instrument for the promotion of democracy and human rights worldwide (Appendix A.1).
	Council Directive 2004/83/EC of 29 April 2004 on minimum standards for the qualification and status of third-country nationals and stateless persons as refugees or as persons who otherwise need international protection and the content of the protection granted.
	Council Directive 2001/55/EC of 20 July 2001 on minimum standards for giving temporary protection in the event of a mass influx of displaced persons and on measures promoting a balance of efforts between Member States in receiving such persons and bearing the consequences thereof.
	Council Directive 2000/78/EC of 27 November 2000, establishing a general framework for equal treatment in employment and occupation (Appendix A.2).
	Council Directive 2000/43/EC of 29 June 2000 implementing the principle of equal treatment between persons irrespective of racial or ethnic origin (Appendix A.7).

	Council Decision 2000/750/EC of 27 November 2000 establishing a Community action programme to combat discrimination (2001 to 2006) (Appendix A.8).
Risk of Lacking Freedom of Association, Collective Bargaining and Right to Strike	*Ibid.,* Article 2, 1A; 1B in Appendix A.1.
Risk that Country Does Not Provide Adequate Labour Laws or Ratify ILO Conventions	*Regulation (EC) No 1889/2006* of the European Parliament and of the Council of 20 December 2006 on establishing a financing instrument for the promotion of democracy and human rights worldwide (Article 2 in Appendix A.1).
Communicable, Non-Communicable Diseases and Other Health Risks	Council Conclusions of December 2010 on Innovative Approaches for Chronic Diseases in Public Health and Healthcare Systems, 3053rd Employment, Social Policy, Health and consumer Affairs Council Meeting.
	COM(2009) 84 Final. Communication from the Commission to the Council and the European Parliament of 23 February 2009 – EU strategy for supporting disaster risk reduction in developing countries (see EC, 2009b).
	COM (2008) 725 Final. Green Paper from the Commission of 10 December 2008 on the health workforce (see EC, 2008b).
	Regulation (EC) No 851/2004 of the European Parliament and of the Council of 21 April 2004 establishing a European centre for disease prevention and control (Appendix A.10).
	COM(2007) 630 Final. White Paper from the Commission titled 'Together for Health: A strategic Approach for the EU 2008-2013' (see EC, 2007b).
	Council Conclusions No. 7062/4 of 9 March 2004 on Promoting Heart Health.
	COM (2007) 279 Final. White Paper from the Commission titled 'A Strategy on Nutrition, Overweight, and Obesity-related health issues' (see EC, 2007c).
	Regulation (EC) No 1568/2003 of the European Parliament and of the Council of 15 July 2003 on aid to fight poverty diseases (HIV/AIDS, malaria and tuberculosis) in developing countries (Appendix A.11).
	Decision 2002/36/EC of the European Parliament and of the Council of 19 December 2001 concerning the Community contribution to the Global Fund to fight HIV/AIDS, tuberculosis and malaria.
	Regulation (EC) No 1257/96 of 20 June 1996 concerning humanitarian aid.
	COM (2005) 153 Final. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Reinforcing EU Disaster and Crisis Response in third countries (see EC, 2005).
	Directive 96/71/EC of the European Parliament and of the Council of 16 December 1996 concerning the posting of workers in the framework of the provision of services
	Regulation (EC) No 1292/96 of 27 June 1996 on food-aid policy and food-aid management and special operations in support of food security.

Risk of Fatality, Injury and Loss of Life Years due to Occupational Influences	Directive 2009/148/EC of the European Parliament and of the Council of 30 November 2009 on the protection of workers from the risks related to exposure to asbestos at work.
	Directive 2004/37/EC of the European Parliament and the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work.
	Directive 2003/10/EC of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise).
	Directive 2000/54/EC of the European Parliament and the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work.
	Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.
	Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation.
	Directive 96/71/EC of the European Parliament and of the Council of 16 December 1996 concerning the posting of workers in the framework of the provision of services (Appendix A.12).
Risk of Gender Inequality	*Ibid.,* Article 2, 1A; 2 in Appendix A.1.
	Council Directive 2000/78/EC of 27 November 2000 on establishing a general framework for equal treatment in employment and occupation (Appendix A.2).
	Council Directive 97/80/EC of 15 December 1997 on the burden of proof in cases of discrimination based on sex.
	Council Directive 86/613/EEC of 11 December 1986 on the application of the principle of equal treatment between men and women engaged in an activity, including agriculture, in a self-employed capacity and on the protection of self-employed women during pregnancy and motherhood.
	Council Directive 76/207/EEC of 9 February 1976 on the implementation of the principle of equal treatment for men and women as regards access to employment, vocational training and promotion, and working conditions.
	Council Directive 75/117/EEC of 10 February 1975 on the approximation of the laws of the Member States relating to the application of the principle of equal pay for men and women.
Risk of High Conflict	*Regulation (EC) No 1934/2004* of the European Parliament and of the Council amending Regulation (EC) No 1726/2000 on development cooperation with South Africa.
	Decision 2003/3 of the ACP-EC Council of Ministers of 11 December 2003 on the use of resources from the long-term development envelope of the ninth EDF for the creation of a Peace Facility for Africa.

	Economic Partnership Agreement between the CARIFORUM States, of the one part, and the European Community and its Member States, of the other part [Official Journal L 289 of 30 October 2008].
	EU-Caribbean Partnership for growth, stability and development (see COM (2006; 2001) in Appendix B.2. a and b).
	EU-Asia Partnership: A Strategic Framework for Enhanced Partnership (see COM (2001) 469 in Appendix B.3).
Risk of Corruption and Fragility in the Legal System	*Council Conclusions of 19 November 2007* on EU response to situations of fragility (General Affairs and External Relations Council) (see COM (2007) in Appendix B.1).
	Commission Decision 1999/396/EC of 2 June 1999 concerning the terms and conditions for internal investigations in relation to the prevention of fraud, corruption and any illegal activity detrimental to the Community's interests.
	Commission Decision 1999/352/EC, ECSC, Euratom of 28 April 1999 establishing the European Anti-Fraud Office (OLAF) (Appendix A.3).
	Regulation (EC) No 1073/1999 of the European Parliament and of the Council of 25 May 1999 concerning investigations conducted by the European Anti-Fraud Office (OLAF) (Appendix A.3).
	Council Regulation (EC) No 1257/96 of 20 June 1996 concerning humanitarian aid (see Appendix A.4).
	EU-Caribbean Partnership for growth, stability and development (see COM (2006; 2001) in Appendix B.2.a and b).
Risk of No Access to Health, Education, Water and Sanitation Services	COM(2008) 725 Final. Green Paper from the Commission of 10 December 2008 on the health workforce (see EC, 2008b).
	Regulation (EC) No 1889/2006 of the European Parliament and of the Council of 20 December 2006 on establishing a financing instrument for the promotion of democracy and human rights worldwide (Appendix A.1).
	Council Regulation (EEC) No 1365/75 of 26 May 1975 on the creation of a European Foundation for the Improvement of Living and Working Conditions (Appendix A.9).
	Council Regulation (EC) No 1257/96 of 20 June 1996 concerning humanitarian aid (Appendix A.4).
	Council Regulation (EC) No 1292/96 of 27 June 1996 on food-aid policy and food-aid management and special operations in support of food security.
Characterisation of Smallholders and Commercial Farms	Council Regulation (EEC) No 1365/75 of 26 May 1975 on the creation of a European Foundation for the Improvement of Living and Working Conditions (Appendix A.9).

APPENDIX E: Basket of Products (BoP) Inventory Data

Note: pc = piece

GTAP Sector	Product	Demand Category	Unit	Apparent Per Capita Consumption	% Domestic	% Extra-territorial
28	Cotton Shirt	Consumer Goods: Clothing	pc	8.43E+00	21.0%	79.0%
29	Shoes	Consumer Goods: Clothing	pair	3.44E+00	24.0%	76.0%
40	Laptop	Consumer Goods: Consumer Electronics	pc	2.01E-02	31.3%	68.7%
41	Dish Washer	Consumer Goods: White Goods	pc	1.78E-02	87.9%	12.1%
41	Refrigerator	Consumer Goods: White Goods	pc	2.26E-02	63.8%	36.2%
41	Washing Machine	Consumer Goods: White Goods	pc	2.14E-02	85.3%	14.7%
38	Mid Class Car (Euro 3)	Mobility: Private Transport: Mid Class Car	pc	1.70E-02	86.3%	13.7%
38	Mid Class Car (Euro 4)	Mobility: Private Transport: Mid Class Car	pc	1.70E-02	86.3%	13.7%
39	Bus (Euro 3)	Mobility: Public Transport: Bus	pc	2.34E-05	100.0%	0.0%
39	Bus (Euro 4)	Mobility: Public Transport: Bus	pc	2.34E-05	100.0%	0.0%
39	Plane	Mobility: Public Transport: Train	pc	3.39E-07	68.3%	31.7%
39	Train	Mobility: Public Transport: Air	pc	1.69E-06	94.0%	6.0%
26	Beer	Nutrition: Beverages	l	9.13E+01	99.6%	0.4%
8	Coffee	Nutrition: Beverages	kg	8.02E+00	99.2%	0.8%
24	Sugar	Nutrition: Crop-Based Products	kg	3.36E+01	100.0%	0.0%
21	Vegetable Oils & Fats	Nutrition: Crop-Based Products: Vegetable Oils & Fats	kg	5.18E+00	97.8%	2.2%
22	Butter	Nutrition: Dairy Products & Eggs	kg	4.24E+00	100.0%	0.0%
22	Cheese	Nutrition: Dairy Products & Eggs	kg	1.83E+01	100.0%	0.0%
22	Milk	Nutrition: Dairy Products & Eggs	kg	7.61E+01	100.0%	0.0%
4	Apples	Nutrition: Fruits	kg	1.73E+01	100.0%	0.0%
4	Oranges	Nutrition: Fruits	kg	3.15E+01	100.0%	0.0%
19	Beef	Nutrition: Meat & Seafood	kg	1.89E+01	100.0%	0.0%
20	Pork	Nutrition: Meat & Seafood	kg	3.85E+01	100.0%	0.0%
20	Poultry	Nutrition: Meat & Seafood	kg	2.16E+01	100.0%	0.0%
4	Potatoes	Nutrition: Vegetables	kg	7.39E+01	100.0%	0.0%
46	High-Rise	Shelter	pc	8.97E-06	100.0%	0.0%
46	Multi-Family House	Shelter	pc	2.37E-04	100.0%	0.0%
46	Single House	Shelter	pc	2.15E-03	100.0%	0.0%

Product	Export Value/unit	Import Value/unit	Data source for values	
Cotton Shirt	7.47	3.14	BoP Prototype Excel Sheet	
Shoes	27.42	5.28	BoP Prototype Excel Sheet	
Laptop	654.98	547.91	BoP Prototype Excel Sheet	
Dish Washer	270.24	156.45	BoP Prototype Excel Sheet	
Refrigerator	270.24	156.45	BoP Prototype Excel Sheet	
Washing Machine	270.24	156.45	BoP Prototype Excel Sheet	
Mid Class Car (Euro 3)	18,548.87	10,740.06	BoP Prototype Excel Sheet	
Mid Class Car (Euro 4)	18,548.87	10,740.06	BoP Prototype Excel Sheet	
Bus (Euro 3)	159,462.81	108,290.48	BoP Prototype Excel Sheet	
Bus (Euro 4)	159,462.81	108,290.48	BoP Prototype Excel Sheet	
Plane	3,865,375.09	5,876,448.28	BoP Prototype Excel Sheet	
Train	1,011,822.89	2,322,556.09	BoP Prototype Excel Sheet	
Beer	0.89	0.96	BoP Prototype Excel Sheet	
Coffee	3.50	8.31	BoP Prototype Excel Sheet	
Sugar	0.67	0.00	DS-016894-EU Trade Since 1988 By HS2-HS4	SUGARS AND SUGAR CONFECTIONERY
Vegetable Oils & Fats	2.02	0.52	BoP Prototype Excel Sheet	
Butter	2.82	1.52	DS-016894-EU Trade Since 1988 By HS2-HS4	BUTTER, INCL. DEHYDRATED BUTTER AND GHEE, AND OTHER FATS AND OILS DERIVED FROM MILK; DAIRY SPREADS
Cheese	3.39	4.06	DS-016894-EU Trade Since 1988 By HS2-HS4	CHEESE AND CURD
Milk	0.43	1.05	DS-016894-EU Trade Since 1988 By HS2-HS4	MILK AND CREAM, NOT CONCENTRATED NOR CONTAINING ADDED SUGAR OR OTHER SWEETENING MATTER
Apples	0.64	0.82	DS-016894-EU Trade Since 1988 By HS2-HS4	APPLES, PEARS AND QUINCES, FRESH
Oranges	0.63	0.56	DS-016894-EU Trade Since 1988 By HS2-HS4	CITRUS FRUIT, FRESH OR DRIED
Beef	3.85	0.10	DS-016894-EU Trade Since 1988 By HS2-HS4	MEAT OF BOVINE ANIMALS, FRESH OR CHILLED and MEAT OF BOVINE ANIMALS, FROZEN
Pork	1.97	1.84	DS-016894-EU Trade Since 1988 By HS2-HS4	MEAT OF SWINE, FRESH, CHILLED OR FROZEN
Poultry	1.86	1.27	DS-016894-EU Trade Since 1988 By HS2-HS4	MEAT AND EDIBLE OFFALS OF FOWLS OF THE SPECIES GALLUS DOMESTICUS
Potatoes	0.30	0.21	DS-016894-EU Trade Since 1988 By HS2-HS4	POTATOES, FRESH OR CHILLED
High-Rise				
Multi-Family House				
Single House				

European Commission
EUR 26483– Joint Research Centre – Institute for Environment and Sustainability

Title: Social Sustainability in Trade and Development Policy

Author(s): Nathan Pelletier, Eda Ustaoglu, Catherine Benoit, Greg Norris

Luxembourg: Publications Office of the European Union

2013– 119 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424 (online)

ISBN 978-92-79-35408-3 (pdf)

doi: 10.2788/659

Abstract

Improving social sustainability within Europe and abroad is among the founding premises of the European Union. European Commission external policy documents – in particular, those associated with trade and development - explicitly call for the use of policy instruments as a means of improving social conditions in third countries. Unclear, however, is the extent to which progress in social sustainability as a result of Commission policy measures is being assessed, nor measures to further leverage improved social sustainability implemented. We conducted a macro-scale analysis of the social risk profile of EU-27 trade by combining trade statistics regarding imports from intra- and extra-territorial trading partners in 2010 with country and sector-specific social risk indicator data covering 17 social themes in five thematic areas: Labour Rights and Decent Work; Health and Safety; Human Rights; Governance; and Community Infrastructure. Our analysis underscores the importance of a life cycle-based approach to understanding and managing social risk in support of policies for socially sustainable development.

LB-NA-26483-EN-N

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.

Publications Office

ISBN 978-92-79-35408-3 (pdf)